

MÉMOIRES

ET

COMPTES RENDUS

DE LA

SOCIÉTÉ ROYALE

DU

CANADA

SECONDE SÉRIE—TOME X

SÉANCE DE JUIN 1904

EN VENTE CHEZ

JAS. HOPE ET FILS, OTTAWA ; LA CIE COPP-CLARK (LIMITÉE), TORONTO
BERNARD QUARITCH, LONDRES, ANGLETERRE

1905

PROCEEDINGS

AND

TRANSACTIONS

OF THE

ROYAL SOCIETY

OF

CANADA

SECOND SERIES—VOLUME X

MEETING OF JUNE, 1904

~~MERCANTILE LIBRARY,~~
~~NEW YORK.~~

~~G 887314~~

FOR SALE BY

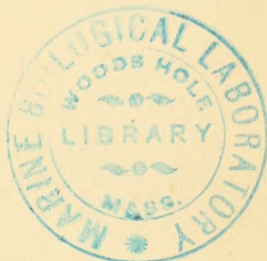
THE NEW YORK
PUBLIC LIBRARY
DUPLICATE
SOLD

JAMES HOPE & SON, OTTAWA ; THE COPP-CLARK CO. (LIMITED), TORONTO
BERNARD QUARITCH, LONDON, ENGLAND

1905



DONATED BY THE
MERCANTILE LIBRARY ASSOCIATION
NEW YORK CITY



A supplementary volume is issued of the Transactions of this year containing Dr. N. E. Dionne's "Inventaire chronologique des livres, brochures, journaux et revues publiés dans la province de Québec de 1764 à 1904."



TABLE OF CONTENTS

<i>List of Officers of the Society for 1904-1905</i>	1
<i>List of Fellows and Corresponding Members</i>	2-4
<i>List of Presidents</i>	5

PROCEEDINGS.

<i>List of Fellows present at May meeting</i>	I
<i>Unable to attend</i>	I
<i>Report of Council</i>	II
1. <i>Printing of Transactions</i>	II
<i>Accounts</i>	II
2. <i>Transactions presented to the King</i>	IV
3. <i>Need of a Home for Society</i>	IV
4. <i>Decease of Members—Mr. Edouard Richard, Abbé H. R. Casgrain (with portraits)</i>	V
5. <i>Election of Fellows</i>	V
6. <i>Corresponding Members</i>	VI
7. <i>Invitations</i>	VI
8. <i>The American Institute of Electrical Engineers</i>	VI
9. <i>Reports of Committees</i>	VII
10. <i>Marine and Lake Biological Stations</i>	VII
11. <i>Tidal and Current Survey</i>	VII
12. <i>Protection of Historical Monuments</i>	VII
13. <i>The Ter centenary Celebration</i>	VII
14. <i>International Geological Congress</i>	VIII
15. <i>Associated Societies</i>	VIII

GENERAL BUSINESS.

<i>Resolutions adopted</i>	IX
<i>Election of Member to Section I.</i>	IX
<i>Election of Corresponding Member</i>	IX
<i>Invitation and Luncheon</i>	X
<i>Presidential Address</i>	X

<i>Reports of Associated Societies read</i>	X, XI, XXI
<i>Popular Lecture by Dr. W. F. Ganong</i>	XI
<i>Report of Section I</i>	XI
<i>Election of Member to Section II</i>	XII
<i>Committee appointed for the Nomination of Officers</i>	XII
<i>Joint Resolution respecting Preservation of Historical Monu- ments</i>	XIII
<i>Report of Section III</i>	XIII
<i>Resolution respecting Hydrographic Survey Department</i>	XIV
<i>Report of Delegates at Annapolis</i>	XIV
<i>Votes of Thanks to St. John Citizens, etc</i>	XIV
<i>Public Meeting</i>	XV
<i>Final Report of Section III</i>	XV
<i>Report of Section II</i>	XVII
<i>Delegates appointed to represent Society at Celebration at St. Croix Island</i>	XIX
<i>Votes of Thanks</i>	XIX
<i>Resolution re International Congress</i>	XIX
<i>Report of Section IV</i>	XX
<i>Election of General Officers</i>	XXI
<i>Vote of Thanks to Honorary-Secretary</i>	XXII
<i>Vote of Thanks to Honorary-Treasurer</i>	XXII

APPENDICES

A.—PRESIDENTIAL ADDRESS.

<i>The United Empire Loyalists and their Influence upon the History of this Continent. By Lt.-Col. G. T. Deni- son</i>	XXV
--	-----

B.—MARINE AND LAKE BIOLOGICAL STATIONS OF CANADA.

<i>Atlantic Biological Station</i>	XLIII
<i>Lake Biological Station</i>	XLVII

C.—SURVEY OF TIDES AND CURRENTS.

<i>Survey of Tides and Currents in Canadian Waters</i>	LI
--	----

D.—REPORTS FROM ASSOCIATED LITERARY AND SCIENTIFIC SOCIETIES.

I. <i>The Numismatic and Antiquarian Society of Montreal</i>	LVII
II. <i>The Miramichi Natural History Association</i>	LVIII
III. <i>The Women's Canadian Historical Society of Toronto</i>	LXI
IV. <i>The Natural History Society of Montreal</i>	LXIII
V. <i>The Niagara Historical Society</i>	LXVI
VI. <i>The Ottawa Field Naturalists' Club</i>	LXVII
VII. <i>The Women's Canadian Historical Society of Ottawa</i>	LXXI
VIII. <i>The Natural History Society of New Brunswick</i> ...	LXXII
IX. <i>The Entomological Society of Ontario</i>	LXXVI
X. <i>The Nova Scotian Institute of Science</i>	LXXX
XI. <i>The New Brunswick Historical Society</i>	LXXXII
XII. <i>The Cercle Littéraire et Musical de Montréal</i>	LXXXIV
XIII. <i>The Historical and Scientific Society of Manitoba</i> ...	LXXXIV
XIV. <i>The Canadian Institute, Toronto</i>	LXXXV
XV. <i>The New Brunswick Loyalists Society</i>	LXXXVI
XVI. <i>The Botanical Club of Canada</i>	LXXXVII

TRANSACTIONS.

SECTION I.

LITTÉRATURE FRANÇAISE, HISTOIRE, ARCHÉOLOGIE, ETC.

I. <i>L'honorable Joseph Royal—Sa vie—Ses œuvres.</i> Par le juge L.-A. PRUD'HOMME.....	3
II. <i>Les capitaines de Marin, sieurs de la Malgue, chevaliers de St- Louis, officiers canadiens, &c., en la Nouvelle-France, de 1680 à 1762.</i> Par REGIS ROY.....	25
III. <i>Eloge historique de monsieur l'abbé H.-R. Casgrain.</i> Par le juge A.-B. ROUTHIER.....	35
IV. <i>La Maison de Borgia—premier poste de Wolfe à la bataille des Plaines d'Abraham—Où était-elle située?</i> Par P.-B. CASGRAIN.....	45
V. <i>Le Haut-Canada avant 1615.</i> Par BENJAMIN SULTE	63
VI. <i>Inventaire chronologique des livres, brochures, journaux et revues publiés dans la province de Québec de 1764 à 1904.</i> Par N.-E. DIONNE.	

Cet inventaire, pour faciliter les références, a été publié en un volume distinct, avec sa propre pagination.

SECTION II.

ENGLISH HISTORY, LITERATURE, ARCHÆOLOGY, ETC.

I. <i>A Monograph of the Origins of Settlements in the Province of New Brunswick (with Maps). (Contributions to the History of New Brunswick, No. 6.)</i> By WILLIAM F. GANONG, M.A., Ph.D.....	3
II. <i>Shelley's Debt to Eighteenth Century Thought.</i> By PELHAM EDGAR, Ph.D.....	187
III. <i>The Jesuit Missions of Canada.</i> By W. H. WITHROW, D.D.	201
IV. <i>The Monument to Wolfe on the Plains of Abraham, and the Old Statue at "Wolfe's Corner."</i> By P.-B. CASGRAIN	213
V. <i>Radisson in the Northwest, 1661-63.</i> By BENJAMIN SULTE.	223
VI. <i>Pythagoras and his Philosophy.</i> By ARTHUR HARVEY.,.	239
VII. <i>Thomas Pownall—His Part in the Conquest of Canada.</i> By W. D. LIGHTHALL, M.A.....	265

SECTION III.

MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES.

I. <i>Note on an apparently Accidental Formation of Frazil Ice in a Cryophorus.</i> By PROF. JOHN COX.....	3
II. <i>The Relation of Thermal Change to Tension and Compression Stress, with an account of some Experiments on Impulsive Stress. (Diagrams.)</i> By E. G. COKER, M.A., D.Sc., F.R.S.E., and C. M. MCKERGOW, M.Sc...	5
III. <i>Researches in Physical Chemistry carried out in the University of Toronto during the past Year.</i> Communicated by PROF. W. LASH MILLER.....	25
IV. <i>On the Artificial Production of Frazil Ice, together with Measurements of the Temperature Conditions in the Water.</i> By H. T. BARNES, D.Sc.....	29
V. <i>The Growth of Ice Crystals in the Bunsen Ice Calorimeter. (Diagrams.)</i> By H. T. BARNES, D.Sc., and A. S. B. LUCAS, B.Sc.....	33
VI. <i>Phenol-phthalein and the Theory of Indicators.</i> By D. MCINTOSH.....	41
VII. <i>The Variation of the Valency of Elements with Temperature.</i> By E. H. ARCHIBALD and D. MCINTOSH	43
VIII. <i>A Revision of the Atomic Weight of Potassium—1. The Analysis of Potassium Chloride. (Diagram.)</i> By E. H. ARCHIBALD, A.M., Ph.D.....	47

TABLE OF CONTENTS

V

IX. <i>On the Radioactivity of Natural Gas.</i> By DR. J. C. McLENNAN.....	55
X. <i>An Examination of some Canadian Micæ.</i> By J. E. EGLESON, B.Sc.....	57
XI. <i>On the Loss of Substances, useful as Plant Food, sustained in Moss Manure.</i> (Diagrams.) By THOMAS MACFARLANE	61
XII. <i>Notes on the Difference of Temperature, McGill College Grounds and Mount Royal, Montreal, Canada.</i> (Diagrams.) By PROF. C. H. McLEOD and DR. H. T. BARNES.....	71
XIII. <i>On the Backwater produced by Weirs of Different Widths.</i> (Diagrams.) By H. T. BOVEY, LL.D., F.R.S....	127

SECTION IV.

GEOLOGICAL AND BIOLOGICAL SCIENCES.

I. <i>On the Squamoso-parietal crest of the horned Dinosaurs Centrosaurus apertus and Monoclonius Canadensis from the Cretaceous of Alberta.</i> (Plates.) By LAWRENCE M. LAMBE, F.G.S.....	3
II. <i>The Progress of Vertebrate Palæontology in Canada.</i> By LAWRENCE M. LAMBE, F.G.S.....	13
III. <i>Notes on Tertiary Plants from Canada and the United States.</i> By D. P. PENHALLOW.....	57
IV. <i>New Species and a New Genus of Batrachian Footprints of the Carboniferous System in Eastern Canada.</i> (Plates.) By G. F. MATTHEW, D.Sc., LL.D.....	77
V. <i>The Volcanic Rocks of New Brunswick.</i> (Plate.) By L. W. BAILEY, LL.D.....	123
VI. <i>The Study of Canadian Fungi: A Review.</i> By G. U. HAY, D.Sc.....	139
VII. <i>Bibliography of Canadian Entomology for the Year 1903.</i> By Rev. C. J. S. BETHUNE, D.C.L.....	147
VIII. <i>Bibliography of Canadian Botany for 1903.</i> By A. H. MACKAY, LL.D	153
IX. <i>Bibliography of Canadian Zoology for 1903, exclusive of Entomology.</i> By J. F. WHITEAVES.....	161
X. <i>Influence de la situation géographique de la ville de Québec sur un point de météorologie locale.</i> Par Mgr. J. C. K. LAFLAMME.....	167
XI. <i>Memorial or Sketch of the Life of the late A. R. C. Selwyn, C.M.G., LL.D., F.R.S., F.G.S., etc., etc., Director</i>	

<i>of the Geological Survey of Canada from 1869 to 1894.</i> By H. M. AMI, M.A., D.Sc., F.G.S., of the Geological Survey of Canada.....	173
XII. <i>Bibliography of Canadian Geology and Palæontology for the year 1903.</i> By H. M. AMI, M.A., D.Sc., F.G.S., of the Geological Survey of Canada.....	207

LIST OF ILLUSTRATIONS.

PROCEEDINGS.

Portraits of Deceased Fellows—M. Edouard Richard and Abbé H. R. Casgrain.....	I
---	---

SECTION II.

Two large lithographed maps and 14 smaller maps to illustrate Prof. Ganong's "Settlements in New Brunswick".....	3 <i>et seq.</i>
One cut to illustrate Mr. Harvey's "Pythagoras".....	263

SECTION III.

Eight diagrams to accompany Messrs. Coker and McKergow's "Thermal Change to Tension".....	8 <i>et seq.</i>
Four diagrams to illustrate Messrs. Barnes and Lucas' "Growth of Ice Crystals".....	34 <i>et seq.</i>
One figure to illustrate Mr. Archibald's "Atomic Weight of Potassium".....	50
Two diagrams to illustrate Mr. Macfarlane's "Moss Manure".....	67, 69
Fifty-eight diagrams to accompany Messrs. McLeod and Barnes' "Difference in Temperature".....	77 <i>et seq.</i>
Eight diagrams to illustrate Prof. Bovey's "Weirs".....	133 <i>et seq.</i>

SECTION IV.

Two heliotype process plates to accompany Mr. Lambe's "Horned Dinosaur".....	10 <i>et seq.</i>
Six plates to illustrate Dr. Matthew's "Batrachian Foot-prints".....	111 <i>et seq.</i>
One plate to illustrate Prof. Bailey's "Volcanic Rocks".....	125
One portrait to accompany Dr. Ami's "Memoir on Selwyn".....	172a

THE ROYAL SOCIETY OF CANADA.

FOUNDER: HIS GRACE THE DUKE OF ARGYLL, K.G., &c.,
(WHEN GOVERNOR-GENERAL OF CANADA IN 1882.)

OFFICERS FOR 1904-1905.

HONORARY PRESIDENT:

HIS EXCELLENCY THE RT. HON. THE EARL OF MINTO,
G.C.M.G., &c.

PRESIDENT—B. SULTE

VICE-PRESIDENT—DR. ALEX. JOHNSON

HONORARY SECRETARY, DR. S. E. DAWSON

HONORARY TREASURER, DR. JAMES FLETCHER

OFFICERS OF SECTIONS:

SEC. I.—French Literature, History, and Allied Subjects.

PRESIDENT, HON. L.-O. DAVID
VICE-PRESIDENT, J.-E. ROY
SECRETARY, LÉON GÉRIN

SEC. II.—English Literature, History, and Allied Subjects.

PRESIDENT, W. D. LIDTHALL
VICE-PRESIDENT, GEORGE MURRAY
SECRETARY, W. WILFRED CAMPBELL

SEC. III.—Mathematical, Physical, and Chemical Sciences.

PRESIDENT, PROF. RUTHERFORD
VICE-PRESIDENT, PROF. BAKER
SECRETARY, DR. E. DEVILLE

SEC. IV.—Geological and Biological Sciences.

PRESIDENT, PROF. FOWLER
VICE-PRESIDENT, DR. H. S. POOLE
SECRETARY, LAWRENCE LAMBE

ADDITIONAL MEMBERS OF COUNCIL:

SIR S. FLEMING, K.C.M.G.
DR. S. E. DAWSON
PRESIDENT LOUDON.
DR. DECELLES
T. C. KEEFER, C.M.G.
SIR JAMES GRANT, K.C.M.G.
LT.-COL. G. T. DENISON

¹ The Council for 1904-1905 comprises the President and Vice-President of the Society, the Presidents, Vice-Presidents and Secretaries of Sections, the Honorary Secretary and the Honorary Treasurer, besides ex-Presidents of the Society during three years from the date of their retirement, and not more than four members of the Society who have formerly served on the Council, elected by the Council

THE ROYAL SOCIETY OF CANADA.

LIST OF MEMBERS, 1904-1903.

I.—LITTÉRATURE FRANÇAISE, HISTOIRE, ARCHÉOLOGIE, ETC.

- BEAUCHEMIN, NÉRÉE, M.D., *Yamachiche, P.Q.*
BÉGIN, MGR L.-N., Archevêque de Québec, *Québec*.
BELLEMARE, RAPHAEL, docteur ès lettres, *Montréal*.
CHAPAIS, L'HON. THOMAS, docteur ès lettres, chevalier de la légion d'honneur de France, membre du conseil législatif, *Québec*.
CHARLAND, PÈRE PAUL-V., docteur ès lettres, *Fall River, Mass., E.U.*
DAVID, HON. L.-O., *Montréal*.
DECAZES, PAUL, docteur ès lettres, *Québec*.
DECELLES, A.-D., docteur ès lettres, LL.D., *Ottawa*.
DIONNE, N.-E., docteur ès lettres, *Québec*.
FABRE, HECTOR, C.M.G., officier de la légion d'honneur, *Paris, France*.
FRÉCHETTE, LOUIS, C.M.G., docteur en droit, docteur ès lettres, chevalier de la légion d'honneur, *Montréal* (ancien président).
GAGNON, ERNEST, docteur ès lettres, *Québec*.
GÉRIN, LÉON, *Ottawa*.
GOSSELIN, L'ABBÉ AUGUSTE, docteur ès lettres, *St-Charles de Bellechasse, P.Q.*
LEGENDRE, NAPOLEON, docteur ès lettres, *Québec*.
LEMAY, PAMPHILE, docteur ès lettres, *Québec*.
LEMOINE, SIR J.-M., *Québec* (ancien président).
PAQUET, MONSIGNOR L. A., *Québec*.
POIRIER, HON. PASCAL, officier de la légion d'honneur, *Shediac, N.B.*
POISSON, ADOLPHE, docteur ès lettres, *Arthabaskaville, P.Q.*
PRUD'HOMME, JUGE L. A., *St. Boniface, Man.*
ROUTHIER, JUGE A.-B., docteur en droit et ès lettres, *Québec*.
ROY, L'ABBÉ CAMILLE, docteur ès lettres, licencié ès lettres de l'université de Paris, *Québec*.
ROY, JOSEPH-EDMOND, docteur ès lettres, *Lévis, P.Q.*
SULTE, BENJAMIN, *Ottawa*.

II.—ENGLISH LITERATURE, HISTORY, ARCHÆOLOGY, ETC.

- BRYCE, REV. GEORGE, M.A., LL.D., *Winnipeg, Man.*
BURWASH, REV. NATHANIEL, S.T.D., LL.D., Chancellor of Victoria University, *Toronto*.
CAMPBELL, W. WILFRED, Privy Council Office, *Ottawa*.
CLARK, REV. W., D.C.L., LL.D., Trinity University, *Toronto* (ex-president).
DAWSON, S. E., Lit.D., *Ottawa*.
DENISON, LT.-COL. G. T., B.C.L., *Toronto* (ex-president).
DRUMMOND, W. H., M.D., *Montreal*.
HARVEY, ARTHUR, *Toronto*.
HOWLEY, MOST REV. ARCHBISHOP M. F., D.D., *St. John's, Nfld.*
GORDON, REV. CHARLES W., *Winnipeg*.
LESUEUR, W. D., LL.D., *Ottawa*.
LIGHTHALL, WILLIAM DOUW, M.A., B.C.L., *Montreal*.
LONGLEY, HON. J. W., LL.D., M.L.A., *Halifax, N.S.*
MORGAN, HENRY J., LL.D., *Ottawa*.
MURRAY, GEORGE, B.A., *Montreal*.

MURRAY, REV. J. CLARK, LL.D., *Montreal*.
 O'BRIEN, MOST REV. DR., Archbishop of Halifax, *Halifax, N.S.*, (ex-president).
 PARKIN, G. R., C.M.G., LL.D., *Toronto*.
 READE, JOHN, F.R.S.L., *Montreal*.
 ROSS, HON. GEO. W., LL.D., *Toronto*.
 SCOTT, D. CAMPBELL, Department of Indian Affairs, *Ottawa*.
 SCOTT, REV. FREDERICK GEORGE, *Quebec*.
 STEWART, GEORGE, D.C.L., LL.D., D.L., F.R.G.S., *Quebec*.
 WATSON, J., M.A., LL.D., Queen's University, *Kingston*.
 WILLISON, JOHN S., *Toronto*.
 WITHEROW, REV. W. H., D.D., *Toronto*.

III.—MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES.

BAILLAIRGÉ, C., C.E., *Quebec*.
 BAKER, ALFRED, M.A., University of Toronto, *Toronto*.
 BARNES, H. T., D.Sc., McGill University, *Montreal*.
 BOVEY, H. T., M.A. (Cantab.), LL.D., D.C.L., M. Inst. C.E., F.R.S., McGill University, *Montreal*.
 COX, JOHN, M.A. (Cantab.), McGill University, *Montreal*.
 DAWSON, W. BELL, D.Sc., Ma. E., Assoc. M. Inst. C.E., *Ottawa*.
 DEVILLE, E., LL.D., Surveyor-General, *Ottawa*.
 DUPUIS, N. F., M.A., F.R.S.E., Queen's University, *Kingston*.
 ELLIS, W. H., M.D., Toronto University, *Toronto*.
 FLEMING, SIR SANDFORD, K.C.M.G., LL.D., C.E., *Ottawa* (ex-president).
 GIRDWOOD, G. P., M.D., McGill University, *Montreal*.
 GLASHAN, J. C., LL.D., Inspector of Public Schools for City of Ottawa, *Ottawa*.
 GOODWIN, W. L., D.Sc., Queen's University, *Kingston*.
 HAMEL, MONSIGNOR, M.A., Laval University, *Quebec* (ex-president).
 HARRINGTON, B. J., B.A., Ph.D., McGill University, *Montreal*.
 HOFFMANN, G. C., F. Inst. Chem., LL.D., Geological Survey, *Ottawa*.
 JOHNSON, A., LL.D., Vice-Principal Emeritus of McGill University, *Montreal*.
 KEEFER, T. C., C.M.G., C.E., *Ottawa* (ex-president).
 LOUDON, J. T., M.A., LL.D., President of University of Toronto, *Toronto* (ex-president).
 MACFARLANE, T., M.E., Chief Analyst, *Ottawa*.
 MCGILL, A., Assistant Analyst, *Ottawa*.
 MCLENNAN, J. C., Ph.D., Toronto University, *Toronto*.
 MILLER, W. LASH, Ph.D., University of Toronto, *Toronto*.
 MCLEOD, C. H., M.E., McGill University, *Montreal*.
 OWENS, R. B., M.Sc., McGill University, *Montreal*.
 RUTHERFORD, E., B.A. (Cantab.), A.M., McGill University, *Montreal*.
 RUTTAN, R. F., M.D., C.M., McGill University, *Montreal*.
 SHUTT, F. T., M.A., F.I.C., F.C.S., Chemist, Central Experimental Farm, *Ottawa*.
 STUPART, R. F., Superintendent, Meteorological Service, *Toronto*.
 WALKER, J. WALLACE, M.A., Ph.D., McGill University, *Montreal*.

IV.—GEOLOGICAL AND BIOLOGICAL SCIENCES.

ADAMI, J. G., M.A., M.D. (Cantab. and McGill), LL.D., F.R.S.E., McGill University, *Montreal*.
 ADAMS, FRANK D., Ph.D., D.Sc., F.G.S., McGill University, *Montreal*.
 AMI, HENRY M., M.A., D.Sc., F.G.S., Geological Survey, *Ottawa*.
 BAILEY, L. W., M.A., Ph.D., University of New Brunswick, *Fredericton*.
 BARLOW, A. E., M.A., D.Sc., Geological Survey, *Ottawa*.
 BELL, ROBERT, B.Ap.Sc., M.D., LL.D., F.G.S., F.R.S., Geological Survey, *Ottawa*.
 BETAUNE, REV. C. J. S., M.A., D.C.L., *London, Ont.*

- BURGESS, T. J. W., M.D., *Montreal*.
 COLEMAN, A. P., M.A., Ph.D., University of Toronto, *Toronto*.
 ELLS, R. W., LL.D., F.G.S.A., Geological Survey, *Ottawa*.
 FLETCHER, JAMES, LL.D., F.L.S., Dominion Entomologist, *Ottawa*.
 FOWLER, JAMES, M.A., Queen's University, *Kingston*.
 GILPIN, EDWIN, M.A., F.G.S., Inspector of Mines, *Halifax*.
 GRANT, SIR J. A., K.C.M.G., M.D., F.G.S., *Ottawa* (ex-president).
 HAY, G. U., M.A., Ph.D., *St. John, N.B.*
 HARRINGTON, W. HAGUE, P. O. Department, *Ottawa*.
 LAFLAMME, ABBÉ J. C. K., D.D., M.A., chevalier de la légion d'honneur, Laval University, *Quebec* (ex-president).
 LAMBE, LAWRENCE M., F.G.S., Geological Survey, *Ottawa*.
 MACALLUM, A. B., Ph.D., University of Toronto, *Toronto*.
 MACCOUN, J., M.A., F.L.S., Geological Survey, *Ottawa*.
 MACKAY, A. H., LL.D., B.Sc., Superintendent of Education for Nova Scotia, *Halifax*.
 MATTHEW, G. F., M.A., D.Sc., *St. John, N.B.*
 MILLS, T. WESLEY, M.A., M.D., McGill University, *Montreal*.
 PENHALLOW, D. P., B.Sc., McGill University, *Montreal*.
 POOLE, H. S., M.A., C.E., F.G.S., Assoc. Roy. Soc. of Mines, *Halifax, Nova Scotia*
 PRINCE, E. E., B.A., F.L.S., Dominion Commissioner of Fisheries, *Ottawa*
 SAUNDERS, W., LL.D., F.L.S., Director Dominion Experimental Farms, *Ottawa*
 TAYLOR, REV. G. W., *Nanaimo, B.C.*
 WHITEAVES, J. F., LL.D., F.G.S., Geological Survey, *Ottawa*.
 WRIGHT, R. RAMSAY, M.A., B.Sc., University of Toronto, *Toronto*.

CORRESPONDING MEMBERS.

HIS GRACE THE DUKE OF ARGYLL, K.G., K.T., F.R.S., &c.

- BERTHELOT, MARCELIN, Sénateur, Secrétaire Perpétuel de l'Académie des Sciences, Professeur au Collège de France, *Paris, France*.
 BONNEY, T. G., D.Sc., LL.D., F.R.S., *London, England*.
 BRUNETIÈRE, FERDINAND, de l'Académie française, *Paris, France*.
 BRYCE, RT. HON. JAMES, M.P., D.C.L., *London, England*.
 CLARETIE, JULES, de l'Académie française, *Paris, France*.
 GANONG, DR. W. F., *Northampton, Mass.*
 GRAVIER, GABRIEL, *Rouen, France*.
 HECTOR, SIR JAMES, K.C.M.G., F.R.S., *Wellington, New Zealand*.
 HIGGINSON, THOMAS WENTWORTH, LL.D. (Harvard), *Cambridge, Mass.*
 METZLER, W. H., Ph.D., F.R.S. Edin., Mathematical Professor, Syracuse University, *Syracuse, N. Y.*
 OSBORN, DR. HENRY FAIRFIELD, *New York, N.Y.*
 PARKER, SIR GILBERT, Kt., M.P., D.C.L., *London, England*.
 SCUDDER, DR. S. H., *Cambridge, Mass., U.S.A.*

RETIRED MEMBERS. (See RULE 7.)

- BOURASSA, NAPOLEON, *St. Hyacinthe, P.Q.*
 CALLENDAR, HUGH L., M.A. (Cantab.), F.R.S., *London, Eng.*
 CHERRIMAN, J. B., M.A., *Ryde, Isle of Wight*.
 HAANEL, E., Ph.D., Superintendent of Mines, *Ottawa*.
 KIRBY, W., *Niagara, Ont.*
 MACGREGOR, J. G., M.A., D.Sc., F.R.S., F.R.S.E., *Edinburgh, Scotland*.
 MAIR, CHARLES, *Prince Albert, N.W.T.*
 OSLER, W., M.D., Johns Hopkins University, *Baltimore, Md.*
 ROBERTS, C. G. D., M.A., *New York*.

LIST OF PRESIDENTS.

1882-'83	. . . . .	SIR J. W. DAWSON, Kt.
1883-'84	. . . . .	L'HONORABLE P. J. O. CHAUVEAU.
1884-'85	. . . . .	DR. T. STERRY HUNT.
1885-'86	. . . . .	SIR DANIEL WILSON, Kt.
1886-'87	. . . . .	MONSIGNOR HAMEL.
1887-'88	. . . . .	DR. G. LAWSON.
1888-'89	. . . . .	SIR SANDFORD FLEMING, K.C.M.G.
1889-'90	. . . . .	L'ABBÉ CASGRAIN.
1890-'91	. . . . .	VERY REV. PRINCIPAL GRANT.
1891-'92	. . . . .	L'ABBÉ LAFLAMME.
1892-'93	. . . . .	SIR J. G. BOURINOT, K.C.M.G.
1893-'94	. . . . .	DR. G. M. DAWSON, C.M.G.
1894-'95	. . . . .	SIR J. MACPHERSON LEMOINE, Kt.
1895-'96	. . . . .	DR. A. R. C. SELWYN, C.M.G.
1896-'97	. . . . .	MOST REV. ARCHBISHOP O'BRIEN.
1897-'98	. . . . .	L'HONORABLE F. G. MARCHAND
1898-'99	. . . . .	T. C. KEEFER, C.M.G.
1899-1900	- - - - -	REV. PROFESSOR CLARK, D.C.L.
1900-1901	- - - - -	L. FRECHETTE, C.M.G., LL.D.
1901-1902	- - - - -	PRESIDENT LOUDON, LL.D.
1902-1903	- - - - -	SIR JAMES A. GRANT, K.C.M.G. M.D., F.G.S.
1903-1904	- - - - -	LT.-COL. G. T. DENISON, B.C.L.
1904-1905	- - - - -	BENJAMIN SULTE.



ABBÉ H. R. CASGRAIN.



M. EDOUARD RICHARD

ROYAL SOCIETY OF CANADA

PROCEEDINGS FOR 1904

TWENTY-THIRD GENERAL MEETING

SESSION I. (Tuesday, June 21.)

The Royal Society of Canada held its twenty-third general meeting in the High School Building, Union Street, St. John, New Brunswick.

The President, Lieut-Col. Denison, took the chair and called the meeting to order in the Convocation Hall at 3.30 p.m.—the Council having met at 2.30 p.m. to consider their report.

The Honorary Secretary called the roll—the following gentlemen answered to their names or were present during the meeting.

LIST OF FELLOWS PRESENT.

President, Lt.-Col. G. T. Denison.

Vice-President, Benjamin Sulte.

Honorary Secretary, Dr. S. E. Dawson.

Honorary Treasurer, Dr. James Fletcher.

SECTION I.—L'Abbé Bourassa, Le Père Charland, Monsignor Pâquet, Hon. Pascal Poirier, Dr. J. E. Roy, Benjamin Sulte.

SECTION II.—Rev. Dr. Bryce, Rev. Dr. Clark, Dr. S. E. Dawson, Lt.-Col. Denison, Dr. W. D. LeSueur, W. D. Lighthall, Hon. Dr. Longley, George Murray, Rev. Dr. J. Clark Murray, Most Rev. Archbishop O'Brien, Rev. Frederick G. Scott.

SECTION III.—Dr. Ellis, Sir Sandford Fleming, Dr. A. Johnson, Thos. Macfarlane, Prof. McLeod.

SECTION IV.—Dr. Ami, Dr. Bailey, Dr. Bell, Dr. Fletcher, Prof. Fowler, Sir James Grant, Dr. G. U. Hay, Dr. A. H. MacKay, Dr. Matthew, Dr. H. S. Poole, Prof. Prince.

Letters or messages from absent Fellows regretting their inability to attend, were received from:—

SECTION I.—Dr. Bellemare, L'Abbé Gosselin, Sir J. M. LeMoine, le Juge Routhier.

SECTION II.—Rev. Dr. Burwash, W. W. Campbell, John Reade, D. C. Scott, J. S. Willison, Rev. Dr. Withrow.

SECTION III.—Dr. Barnes, Dr. Bovey, Prof. Cox, Dr. W. Bell Dawson, Dr. Deville, Monsignor Hamel, Dr. Harrington, Dr. Hoffmann, A. McGill, Dr. McLennan, Prof. Rutherford, F. T. Shutt.

SECTION IV.—Rev. Dr. Bethune, Dr. Ells, Abbé Laflamme, L. M. Lambe, Dr. Macallum, Prof. Penhallow, Prof. R. Ramsay Wright, Dr. Whiteaves.

The Honorary Secretary then read the following

REPORT OF COUNCIL, 1904.

The Council of the Royal Society of Canada have the honour to present their twenty-second annual report, as follows:—

1. PRINTING OF TRANSACTIONS.

The ninth volume of the second series is completely printed. It consists of 908 pages and contains 81 maps and illustrations of various kinds.

The accounts have been audited by experts in the usual way, and are as follows:—

Statement of Balance Carried Over.

1903

May 22—To Balance carried over as per page IV Proceedings	
for 1903	\$ 929 03
<i>Cr.</i>	
May 22—By Free Press, advertizing meeting . . .	\$ 7 00
“ — “ Citizen, advertizing meeting	8 00
“ — “ Evening Journal, advertizing meeting.	8 50
“ — “ Taylor & Clark, printing programmes.	39 00
“ — “ C. P. R. Telegraph Co.	28 50
“ — “ Mortimer & Co. (printing)	11 25
“ — “ Eli Helliard (services at meeting)	6 00
May 30— “ Donald Heins (services at meeting) ..	10 00
“ — “ Oliver McDonald (services at meeting)	5 00
June 9— “ Orme & Co. (services at meeting)	5 00
“ — “ John P. Dunn (use of stereopticon) ..	10 00
“ — “ M. G. Bristow (typewriting)	2 16
17— “ Gazette Printing Co.	620 96
“ — “ Secretary (sundry disbursements) ...	13 33
“ — “ Manufacturing Stationers' Co. (on	
account)	154 33
	————\$ 929 03

Statement, July 1st, 1903, to June 1st, 1904.

1903	
Nov. 1—	To Government grant (on account).....\$3,000 00
1904	
Feb. 25—	“ Balance of grant 2,000 00
	<hr/>
	\$5,000 00

Cr.

1903	
Nov. 1—	By Taylor & Clark (printing) \$ 1 75
“ 5—	“ Grip Company (illustrations) 194 00
“ —	“ R. P. King (engrossing) 1 25
“ —	“ Gazette Printing Co. (balance) 11 08
“ —	“ M. G. Bristow (typewriting) 90
“ —	“ C. A. R. (freight, 88c and \$1.24) 2 12
“ —	“ Express charges 25 00
“ —	“ Pierre George Roy (illustrations) 6 80
“ 9—	“ Entomological Soc. of Phila. (plates) 46 00
“ —	“ Express charges 2 20
“ —	“ Gazette Printing Co. (on account) 500 00
“ 21—	“ Manufacturing Stationers' Co. (on acct., binding, freight and delivery) 450 00
Dec. 5—	“ Can. Pac. Ry. 3 96
“ —	“ E. Jas. Low (illustrations) 2 00
“ —	“ Jas. Hope & Co. (stationery) 1 25
“ 8—	“ Gazette Printing Co. (on account) 250 00
1904	
Jan. 7—	“ Toronto Litho Co. (illustrations) 60 00
“ —	“ Grip Company 4 40
“ —	“ Proofreading 25 00
“ —	“ Express charges 1 75
“ —	“ Gazette Printing Co. (on account) 500 00
“ —	“ Proofreading (on account) 75 00
Feb. 20—	“ Gazette Printing Co. (on account) 700 00
“ —	“ M. G. Bristow (typewriting) 1 40
“ —	“ Express charges 3 70
“ —	“ M. G. Bristow (typewriting) 70
“ —	“ R. P. King (engrossing) 3 75
“ —	“ R. T. Taylor (printing) 1 00
“ 26—	“ Insurance (Caledonian Co.) 73 35

IV

ROYAL SOCIETY OF CANADA

Apl. 13—By John Robertson (storage).....	36 00
“ — “ Proofreading (balance)	45 00
“ — “ George Cox (stationery)	14 50
“ — “ Mortimer & Co. (binding separates)	114 13
“ — “ Insurance	12 32
“ — “ W. C. Bowles (clerical assistance)	60 00
“ — “ Grip Company (illustrations)	76 75
“ — “ Jas. Hope & Son	1 75
“ — “ Secretary (sundry disbursements)	1 20
“ — “ Canada Atlantic Ry.	1 45
“ — “ Express charges	11 60
May 13— “ Gazette Printing Co. (balance)	425 30
“ 18— “ Manufacturing Stationers’ Co. (balance)	54 82
“ — “ Expenses for arrangements of meeting	47 00
Balance	1,149 82
	<hr/>
	\$5,000 00

There was a notable improvement in the date when the papers came in for publication, and this has resulted in an earlier delivery of the separate copies, notwithstanding the unusually late date at which the Government grant was available. The scientific sections can less afford to wait than the literary sections, and they therefore have precedence when possible. A delay in the issue of the separates may imperil a just claim to priority in some important discovery, a consideration which does not apply to the literary sections. The number of separate publications was very large this year. There were 43 papers in the four sections, and 7,112 separates were given to Fellows of the Society.

2. TRANSACTIONS PRESENTED TO THE KING.

A copy of volume VIII of the Transactions specially bound was presented to His Majesty, and graciously accepted.

3. NEED OF A HOME.

The want of a room in which the volumes of Transactions can be opened out so as to be accessible is very badly felt. There are a number of applications for back volumes which might be filled if there was a place to spread out reserve volumes, and select for binding such as are required. The reserve stock is in sheets and has been kept packed in

cases in Montreal, but is now ordered to be removed to Ottawa with a view to being opened up and bound, when the distribution of volume IX is complete. There are between fifty and sixty cases of exchanges also in warehouse at Ottawa. It is to be hoped that in the new Memorial Building to be erected room will be provided for a home for the Society.

4. DECEASE OF MEMBERS.

During the year just elapsed the Society has had to deplore the loss of two members, both from the First Section. The Abbé Casgrain was in the very front rank of Canadian *littérateurs*. His life and work are treated fully in a paper by a competent and sympathetic hand, to appear in the Transactions of this year.

Mr. Edouard Richard, who died on March 27th, 1904, at Battleford, was elected a Fellow of the Society in 1896, after the publication at Montreal of his work, *Acadia*, in two octavo volumes. The book made a deep impression because of the number of new authorities cited upon the question of the dispersion of the Acadians. While exonerating the British Government, Mr. Richard fixed the responsibility of the measure upon Governor Lawrence and the people of Boston. Whatever view may be held upon that vexed question, the work is one which must be taken into account by all future writers upon that period of our history.

After leaving college Mr. Richard studied law and practised as an advocate from 1868 to 1876, when failing health compelled him to abandon the practice of his profession. The same cause forced him to give up public life; for from 1872 to 1878 he had represented Megantic in the House of Commons. With a hope that a change of climate would be of benefit he accepted the position of Sheriff of the Northwest Territories, but resigned in 1883, and his book on *Acadia* was written in the following years.

In 1897 Mr. Richard was sent to Paris to take the work in the French Archives intermitted because of the death of Mr. Joseph Marmette. He returned to Canada in 1902, bringing with him a mass of precious material for the history of Canada. But his health was too seriously impaired for the literary labours he had been hoping to undertake, and he died at Battleford in his sixtieth year. His memory will long be held in high estimation by those who knew him.

5. ELECTION OF FELLOWS.

The death of the Abbé Casgrain occurred before the time for nominations had expired. Mr. Richard's death was after that date, and there is therefore still a vacancy in the First Section.

To fill the vacancy caused by the decease of the Abbé Casgrain, nominations were asked for in the usual way, and in due time the ballot papers were sent out and returned, with the result that the requisite majority of the Fellows of the whole section voted for the election of L'Abbé Camille Roy, who is therefore recommended to the Society for election as a Fellow.

In Section II. there were two vacancies. Four nominations were received, and the votes were so distributed as not to give a majority of the whole section for any one of them. Both vacancies are therefore still open.

6. CORRESPONDING MEMBERS.

The Council has received a nomination in due form from the First Section, and in accordance therewith recommends to the Society the election as Corresponding Member of Monsieur Ferdinand Brunetière. M. Brunetière is a member of the Académie Française, editor of the *Revue des Deux Mondes*, and the author of much valuable work in letters. In connection with Canada he has taken an important part in establishing the course of study in Literature at Laval University which has been so successful.

7. INVITATIONS.

The Fourteenth Annual Session of the International Congress of Americanists is, this year, to be held at Stuttgart, from August 18 to 23, and an invitation has been received to send a delegate.

An invitation was also received from the President, Trustees and Fellows of Brown University to send a delegation to be present at the dedication of the library on May 17. It was acknowledged with thanks, but no meeting of Council occurred in time to take action.

The President, Regents and Faculty of the University of Wisconsin also sent an invitation to the Society to depute a representative to attend the Jubilee of the University,—the fiftieth anniversary of its first commencement,—at Madison, on June 5 and the five following days.

8. THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

The Committee of Organization of the International Electrical Congress at St. Louis, has sent a very cordial invitation to the Royal Society to co-operate in the Congress at St. Louis from the 12th to 17th September next. One of our Fellows, Prof. H. T. Barnes, is the Secre-

tary of the Congress and has written to urge the matter upon the attention of the Society.

The invitation has been acknowledged, and the papers in connection therewith are referred to the Third Section.

9. REPORTS OF COMMITTEES.

The Committee on an Ethnological Survey of Canada will not send in a report at this session, and no formal report has come in from the Committee on a proposed Hydrographic Survey.

10. BIOLOGICAL STATIONS.

Of this most interesting and important work no report has so far come in, but detailed reports of the stations both on the Atlantic and Lake Huron are promised and will be printed as Appendix B.

11. TIDAL AND CURRENT SURVEY.

Dr. W. Bell Dawson has sent in a detailed report of the progress of this important work, which will appear in Appendix C to the Proceedings.

12. PROTECTION OF HISTORICAL MONUMENTS.

Acting upon a resolution passed at last year's meeting, the Council has procured copies of the Statute Laws of England and France upon the subject, and refers them to the First and Second Sections of the Society.

Circulars inclosing printed copies of the Resolutions passed in relation to this question were sent out, and the replies received are referred to the same Sections.

13. THE TER-CENTENARY CELEBRATION.

A circular was received in August last from the Historical Society of Nova Scotia inviting the Royal Society to send a delegate or delegates to the commemoration ceremonies to be held at Annapolis on a date to be fixed later, but probably the 23rd and 24th of June. When the decision was arrived at to call the present session at St. John, and

the arrangements were known, the President invited the Most Rev. the Archbishop of Halifax and Dr. A. H. MacKay to represent the Society at the proceedings at Annapolis on June 21 and 22. The celebration at St. John was fixed for the 23rd and 24th, and to that the Royal Society had been invited as a body. The arrangements for reduced rates of transportation so limited the time available for business, that it was necessary to fix the opening meeting of the Royal Society for June 21.

14. INTERNATIONAL GEOLOGICAL CONGRESS.

It will be seen on reference to the Proceedings of last meeting, that the Royal Society was to prepare a statement in detail showing what was proposed to be done and the amount required. The statement was prepared and was sent to the Right Honourable the Premier, who replied that he would draw the attention of the Minister of the Interior to the matter immediately upon that Minister's return from Europe, which was expected shortly.

That was done, for the Honourable Mr. Sifton directly after his return, wrote to say that if the Royal Society would issue the invitation and undertake the management of the reception, he would recommend that a grant of \$25,000 should be placed at its disposal.

The essential financial basis being then secure, the President and Secretary forthwith sent the invitations off, and the Honourable Mr. Sifton authorized Dr. Bell to go to the Congress at Vienna, at public expense, to support it by personal representations. On Dr. Bell's arrival he found the question practically closed. At the time the Congress intimated their desire to hold their next meeting in Canada, a similar wish was communicated to Mexico. The Mexican Government took up the matter very warmly, telegraphed the invitation, and at once sent over two delegates to canvass the members for its acceptance. They were successful in this mission before Dr. Bell arrived.

The proposition having thus fallen to the ground it will not be necessary to go further into details. There was a large mass of correspondence in connection with the matter. The main outline of facts has been given above. The invitation was sent by post and a duplicate followed by next post in addition to the copy carried by Dr. Bell.

15. ASSOCIATED SOCIETIES.

The customary invitations to attend the present meeting and report on the scientific and literary work of the year, were sent to

the following Canadian societies, which have hitherto co-operated with the Royal Society:

SOCIETY	PLACE	DELEGATE
Natural History Society	Montreal	Rev. Robt. Campbell
Numismatic and Antiquarian Society.....	do	Judge Sicotte
Cercle Littéraire de Montréal.....	do	Dr. Ami
Literary and Historical Society.....	Quebec	Rev. F. G. Scott
Literary and Scientific Society.....	Ottawa	Dr. W. D. LeSueur
Field Naturalists' Club	do	Dr. Fletcher
Entomological Society of Ontario.....	London	Dr. Fletcher
Canadian Institute.....	Toronto	Dr. R. Ramsay Wright
Natural History Society of N.B.....	St. John	Hon. Senator Ellis
N.B. Loyalists' Society.....	do	A. A. Stockton
N. S. Institute of Natural Science.....	Halifax.....	Dr. H. S. Poole
Historical Society of Nova Scotia.....	do .....	.....
Natural History Society of B. C.....	Victoria, B.C.....	.....
Wentworth Historical Society	Hamilton, Ont.....	.....
Elgin Historical and Scientific Society.....	St. Thomas, Ont.....	.....
Historical Society of Manitoba.....	Winnipeg.....	Hon. David Laird
Botanical Club of Canada	Halifax, N.S.....	Dr. A. H. MacKay
Royal Astronomical Society	Toronto .....	.....
Lundy's Lane Historical Society.....	Niagara Falls.....	.....
New Brunswick Historical Society	St. John.....	Clarence Ward
Historical Society of Ontario.....	Toronto .....	.....
Women's Canadian Historical Society of Toronto	do	Miss FitzGibbon
Niagara Historical Society.....	Niagara	Miss Carnochan
United Empire Loyalists' Association of Ontario.....	Hamilton .....	.....
Natural History Association.....	Miramichi.....	J. L. Stewart
Canadian Forestry Association	Ottawa .....	.....
Women's Canadian Historical Society.....	do	Mrs. S. E. Dawson

Resolutions as follows were then passed:

Moved by Rev. Dr. Bryce, seconded by Dr. W. D. LeSueur, and carried:

That the report of Council just read be adopted.

Moved by Sir James Grant, seconded by Sir Sandford Fleming, and carried:

That the minutes of the last annual meeting, as printed in the volume of Proceedings and Transactions, be confirmed.

Proposé par Dr. J. E. Roy, appuyé par Mgr. Pâquet, et résolu:

Que M. l'Abbé Camille Roy, professeur de l'Université Laval, soit élu membre de la Section première en remplacement de M. L'Abbé Casgrain, décédé.

Moved by the Abbé G. Bourassa, seconded by Benjamin Sulte, and carried:

That M. Ferdinand Brunetière, member of the French Academy, be elected a corresponding member of the Society.

An invitation was then read from the Maine Historical Society and the Committee of Citizens of the St. Croix Valley, requesting the Royal Society to attend a celebration to be held on Saturday, June 25, to commemorate the three hundredth anniversary of de Monts' and Champlain's settlement on Dochet Island on the St. Croix River.

The Secretary also read an invitation to the Society, from His Worship the Mayor, to a luncheon at the Union Club, on Wednesday, June 22.

The meeting adjourned and the sections met for organization.

EVENING SESSION (Tuesday, June 21).

The President, Lt.-Col. G. T. Denison, delivered his Presidential Address at 8 p.m., in the Convocation Hall of the High School.

Subject:—The United Empire Loyalists and their influence upon the history of this country.

For Address see Appendix A.

After which the Fellows and Delegates attended a reception given by Mrs. J. V. Ellis.

SESSION II. (Wednesday, June 22).

The Society met at 11.30 a.m. in the Convocation Hall, when the Delegates of Associated Societies were called upon for their respective reports. The following were read or presented. (The reports of these Societies are printed together as Appendix D.)

The report of the Numismatic and Antiquarian Society of Montreal, read by Hon. Judge Sicotte.

Report of the Miramichi Natural History Association, presented by Mr. J. L. Stewart.

Report of the Women's Canadian Historical Society of Toronto, sent in by Miss Agnes Fitz-Gibbon, who was unable, because of illness, to attend.

Report of the Natural History Society of Montreal, sent in by Rev. Robert Campbell.

Report of the Niagara Historical Society, sent in by the President, Miss Janet Carnochan.

Report of the Ottawa Field Naturalists' Club, presented by Dr. James Fletcher.

Report of the Women's Canadian Historical Society of Ottawa, presented by Mrs. S. E. Dawson.

Report of the Natural History Society of New Brunswick, read by Hon. Senator Ellis.

Report of the Entomological Society of Ontario, presented by Dr. Fletcher.

Report of the Nova Scotia Institute of Science, read by Dr. Henry S. Poole.

Report of the New Brunswick Historical Society, read by Mr. Clarence Ward.

Report of the Literary and Scientific Society of Ottawa, read by Dr. W. D. LeSueur.

At 12.30 the meeting adjourned to enable the Fellows to attend the Mayor's luncheon.

At 2.30 the Fellows and Delegates were driven out to Duck Cove to a reception given by the ladies of St. John on behalf of the Natural History Society of New Brunswick, the New Brunswick Historical Society, and the Loyalist Society of New Brunswick.

EVENING SESSION (Wednesday, June 22).

At 8 p.m. the Society re-assembled to hear a lecture by Dr. W. F. Ganong, on "The Study of Adaptation in Plants," illustrated by a large number of stereopticon views.

SESSION III. (Thursday, June 23).

The Society met in general session at 2.30 p.m.

The reading of reports from associated societies was resumed.

Report of the Cercle littéraire et musical de Montréal, read by Dr. Ami.

Report of the Historical and Scientific Society of Manitoba, read by Hon. David Laird.

Report from the Botanical Club of Canada, presented by Dr. A. H. MacKay.

Section I. presented its report as follows:—

Rapport de la Section I.

La section a l'honneur de faire rapport que durant les séances des 21, 22 et 23 juin 1904, les membres dont les noms suivent étaient présents et ont pris part aux travaux :

L'honorable M. Pascal Poirier, Mgr. L. A. Pâquet, M. l'Abbé Gustave Bourassa, le R. P. V. Charland, MM. Benjamin Sulte et J. Edmond Roy.

M. L. W. Sicotte, représentant la Société d'Archéologie et de Numismatique de Montréal, a assisté aussi à nos séances.

Les travaux lus et recommandés pour l'impression sont les suivants :

1. Eloge de M. l'Abbé H.-R. Casgrain, par M. le Juge Routhier.
2. Eloge de Monsignor Cyprien Tanguay, par Mgr. L. A. Pâquet.
3. L'honorable Joseph Royal, par l'honorable L. A. Prud'homme.
4. La langue française dans la province de Quebec, par Napoléon

Legendre.

5. Jean et Sébastien Cabot, par l'honorable Pascal Poirier.
6. La goutte d'eau, par le R. P. Charland.
7. Le Haut-Canada avant 1630, par Benjamin Sulte.
8. Inventaire chronologique des livres, etc., publiés dans la province de Québec, de 1764 à 1904, par le Dr. N.-E. Dionne.
9. Origine des droits des Français sur l'île Terre-neuve, par le Dr. J.-Edmond Roy.

MM. DeCelles, Chapais et Sulte ont été nommés pour surveiller l'impression des études acceptées.

Les officiers élus pour l'année 1904-1905 sont :

L'honorable L. O. David, président; J.-Edmond Roy, vice-président; Léon Gérin, secrétaire.

Le tout respectueusement soumis.

BENJAMIN SULTE,

Président intérimaire.

J.-EDMOND ROY,

Secrétaire intérimaire.

Section II reported that it had elected the Rev. Chas. W. Gordon (Ralph Connor), of Winnipeg, and Dr. Henry J. Morgan, of Ottawa, to fill the two vacancies in the Section.

Whereupon it was moved by Rev. Dr. Bryce, seconded by Dr. A. H. MacKay, and carried :

That Rule VI of the Regulations be suspended, and the following gentlemen be elected Fellows of the Society: Rev. C. W. Gordon, of Winnipeg, and Dr. Henry J. Morgan, of Ottawa.

It was moved by Rev. Dr. Bryce, seconded by Dr. A. H. MacKay, and carried :

That Sir James Grant, Archbishop O'Brien, Lt.-Col. Denison, Rev. Dr. Clark, and Sir Sandford Fleming be a committee for the nomination of officers for the ensuing year.

On motion of Mr. Thomas Marfarlane, seconded by Dr. Ami, Mr. Sulte was added to the Nominating Committee.

The following report from Sections I and II in joint session was presented by Rev. Dr. Bryce, chairman of Section II:

Resolved by joint agreement between Sections I and II, that Sections I and II agree to report to the Council that it is suggested that the Society memorialize the Dominion Government in favour of the introduction of legislation for the preservation of historical monuments, sites, and buildings, as far as possible similar in principle to that in Great Britain and France, and with the consent of the proprietors, whether private persons or provincial authorities.

The following report was presented from Section III:

Report of Section III.

1. This Section having considered a letter from the Secretary of the National Electric Congress asking the Royal Society of Canada to appoint representatives to the International Electric Congress to be held at St. Louis in September, resolved to recommend that Prof. W. Lash Miller, of the University of Toronto, and Prof. Howard T. Barnes, of McGill University, be appointed as the representatives of the Society to the aforesaid convention.

2. In reply to the request of the American Society of Civil Engineers, it was resolved to recommend to the general meeting that the Royal Society should contribute a copy of the Proceedings of the Society to be placed in the reading rooms of the Liberal Arts Building during the months in which the St. Louis Exposition is open.

3. The Section requests the general meeting to re-appoint the committee, consisting of Prof. C. H. McLeod, Sir Sandford Fleming, Dr. H. T. Bovey, Mr. T. C. Keefer and Capt. E. Deville, named at the Toronto meeting (1902), to urge upon the Government the importance of a general triangulation and geodetic survey for Canada.

4. The Section requests the re-appointment of the committee, consisting of the President of the Society, Sir Sandford Fleming, Mr. T. C. Keefer, Dr. Loudon, Dr. Bovey, Professor McLeod and Dr. Johnson (convener), with power to add, to represent to the Minister of Marine and the Government of Canada the importance of the establishment of a hydrographic survey for Canada in accordance with the accompanying proposed resolution.

C. H. McLEOD,
Acting Secretary.

It was then moved by Dr. Alex. Johnson, seconded by Sir Sandford Fleming, and carried:

That the Royal Society of Canada recognizes with great satisfaction

the efforts of the Minister of Marine to make provision for the safe navigation of the St. Lawrence route.

The Society trusts that the steamship *Gulnare*, recently purchased by the Government, is the beginning of the equipment of a Hydrographic Survey Department, for which there is ample scope in investigating the currents, tides, magnetic, seismic and every other source of danger.

The Society regards it a public duty, urgently to direct attention to this subject, inasmuch as the continued increase in the tonnage of vessels renders it of increasing importance.

The delegation to the Annapolis celebration, referred to in the Report of Council (p. VII), consisting of the Most Rev. Archbishop O'Brien and Dr. A. H. MacKay, made a verbal report, through Archbishop O'Brien, of the successful carrying out of the interesting programme of proceedings on that occasion.

Resolutions as follows were then passed:—

Moved by Dr. W. D. LeSueur, seconded by Rev. Dr. Bryce, and carried:

That the cordial thanks of the Royal Society are hereby tendered to the Mayor and citizens of St. John, for the kind reception and the hearty welcome the Society has met with, not only collectively but personally.

Moved by Sir Sandford Fleming, seconded by Sir James Grant, and carried:—

That the Fellows of the Royal Society desire to record their thanks to the hospitality committee of the citizens of St. John for the great trouble taken in organizing the arrangements for their accommodation; and they also desire to express their sincerest thanks to those citizens who afforded such generous hospitality to the Fellows and Delegates on this occasion.

Moved by Sir James Grant, K.C.M.G., seconded by Most Rev. Archbishop O'Brien, and carried:

That the thanks of the Royal Society are hereby tendered to the Hon. Senator and Mrs. J. V. Ellis for the kind and gracious reception accorded to the Fellows and Delegates on Tuesday evening, June 21.

Moved by Mr. Thos. Macfarlane, seconded by Dr. Ami, and carried:

That the Royal Society desires to express its thanks to His Worship the Mayor for the handsome luncheon at the Union Club at which he was good enough to entertain the Fellows of the Society.

Moved by Mr. W. D. Lighthall, seconded by Dr. W. D. LeSueur, and carried:

That the Royal Society desires to express the thanks of its members to the Hon. Senator Ellis for arranging the interesting excursion on the Harbour provided for their entertainment on the morning of Thursday, June 23.

Moved by Dr. Alex. Johnson, seconded by Rev. Dr. Bryce, and carried:

That the Fellows of the Royal Society individually and collectively acknowledge with thanks their indebtedness to Mr. D. R. Jack for copies of the beautiful special Champlain number of his magazine, *Acadiensis*, given by him to every member of the Society, and wish to express their appreciation of the historic value and interest of the articles it contains.

Moved by Prof. McLeod, seconded by Dr. Ami, and carried:

That the Royal Society desires to record its thanks to Dr. W. F. Ganong for the interesting and instructive lecture on 'Adaptation in Plants,' given before the Society on the evening of June 22.

In the evening at 8 o'clock the Society attended a public meeting of the citizens under the auspices of the New Brunswick Historical Society, at St. Andrew's Church, where addresses were delivered by leading citizens of St. John, members of the Loyalist and Historical Societies, by the Consul-General of France, the Commander of the United States men-of-war in the harbour, representatives of the French Acadians resident in the province and in the United States, and the President and Vice-President of the Royal Society.

SESSION IV. (Friday, June 24.)

The Society reassembled in general session at noon.

The following final report was presented from Section III:—

Report of Section III.

The Third Section begs to present its final report for the meeting of 1904 as follows:—

The section has held four meetings, at which the following members were present. Prof. W. H. Ellis, president of the section; Sir Sandford Fleming, Dr. Alexander Johnson, Mr. T. Macfarlane, and Prof. C. H. McLeod.

In the absence of the secretary of the section, Prof. McLeod has acted for him during the meeting.

Sixteen papers, of which a list is attached, were read.



The officers elected for the ensuing year are as follows;

President, Professor E. Rutherford

Vice-President, Professor Alfred Baker.

Secretary, Capt. E. Deville.

A committee on publication, consisting of Professors Ellis and McLeod, was appointed.

W. H. ELLIS,

President.

C. H. McLEOD,

Acting Secretary.

LIST OF PAPERS.

1.—“Researches in Physical Chemistry carried out in the University of Toronto during the past year. Communicated by Prof. W. Lash Miller.

2.—“The Relation of Thermal Change to Tension and Compression Stress, with an Account of some Experiments on Impulsive Stress,” by E. G. Coker, M.A., D.Sc., F.R.S.E., Assistant Professor of Civil Engineering, and C. M. McKergow, M.Sc., Demonstrator of Civil Engineering, both of McGill University. Presented by Prof. H. T. Bovey.

3.—“A Hydrographic Survey Department for Canada.” by Alexander Johnson, M.A., LL.D., D.C.L.

4.—“Preliminary Note on the Results Obtained by the Callendar Electric Recorder, arranged to show Differences of Air Temperature between the Summit and Base of Mount Royal, Montreal,” by Professor C. H. McLeod and Dr. Howard T. Barnes.

5.—“Results of Soil Temperature Observations at McGill College, Montreal,” by Professor C. H. McLeod and Dr. Howard T. Barnes.

6.—“The Radial Activity of Natural Gases,” By Dr. J. C. McLennan, of the University of Toronto.

7.—“On the Loss of Fertilizing Constituents Contained in Moss Manure,” by Thomas Macfarlane, Mining Engineer, Chief Analyst at the Department of Inland Revenue, Ottawa.

8.—“Preliminary Experiments on the Artificial Production of Frazil Ice, with Relation to the Temperature Conditions in the Water,” By Prof. Howard T. Barnes, D.Sc.

9.—“The Apparent Growth of the Ice Crystal in the Bunsen Ice Calorimeter,” by Prof. Howard T. Barnes, D.Sc., and Mr. S. B. Lucas, B.Sc.

10.—“A Subjective Phenomenon of Vision,” by W. Rupert Turnbull, M.E., Rothesay, N.B. Presented by Dr. G. U. Hay.

11.—“Note on an Apparent Formation of Frazil Ice in a Cryophorus,” by Professor John Cox, McGill University, Montreal.

12.—“Variation in the Valency of Elements with Temperature,” by E. H. Archibald, Ph.D., and D. McIntosh, M.A. Presented by Dr. B. J. Harrington.

13.—“Phenol-Phthalein and the Theory of Indicators,” by D. McIntosh, M.A. Presented by Dr. B. J. Harrington.

14.—“A Revision of the Atomic Weight of Potassium. 1—The Analysis of Potassium Chloride,” by E. H. Archibald, Ph.D. Presented by Dr. B. J. Harrington

15.—“An Examination of some Canadian Miccas,” By J. E. Egleson, B.Sc. Presented by Dr. B. J. Harrington.

16.—“Backwater produced by Diminishing the Width of a Weir,” by Prof. Bovey.

17.—“Relation of Thermal Change to Tension,” Prof. Coker. Presented by Prof. Bovey.

18.—“Radioactivity of Natural Gas,” by Prof. J. C. McLennan.

19.—“The Composition and Energy Equivalent of the Food of Canadian Lumbermen,” by Dr. W. H. Ellis.

Section II presented a report as follows:—

Report of Section II.

The section held four meetings, the President, Dr. Bryce, occupying the chair on each occasion.

In the absence of the Secretary, Mr. William Wilfrid Campbell, Mr. W. D. LeSueur, by request, acted as Secretary.

The following members were also present at the different meetings: Col. Denison, Prof. J. Clark Murray, George Murray, Mr. W. D. Lighthall, Dr. S. E. Dawson, Rev. Prof. Clark, His Grace Archbishop O'Brien, and the Rev. F. G. Scott.

The following papers were submitted:—

1.—“The Jesuit Missions of Canada—the Last of the Hurons.” by the Rev. Dr. Withrow. Presented and read by Mr. W. D. Lighthall. A graphic description, based chiefly on the *Relations des Jésuites* and the “History” of Charlevoix, of the destruction of the Huron nation by the Iroquois.

2.—“The Monument to Wolfe on the Plains of Abraham, and the Old Statue at ‘Wolfe’s Corner,’” by Mr. P. B. Casgrain. Presented through Dr. George Stewart, and read by Mr. W. D. Lighthall.

3.—“Thomas Pownall, his services to the Anglo-Saxon race,” by Mr. W. D. Lighthall, and read in part by him. Pownall is represented

as a man of wide and statesmanlike views, who saw more clearly than any of his contemporaries the essential conditions for Anglo-Saxon supremacy on the American continent.

4.—“Early and Less Known Quests of Science in Rupert’s Land,” by the Rev. Dr. Bryce. An account of the labours and discoveries of David Douglas, botanist and ornithologist (after whom the Douglas pine of British Columbia was named), Captain John Ross, and Sir Henry Lefroy; also of the efforts made by an astronomical party from the United States to observe the solar eclipse of 1860; and of the observations taken at Winnipeg in 1874 and 1882 of the transit of the planet Venus. The author of the paper also referred briefly to the exploratory work of Hind, 1857-9, and of Palliser, 1857-8.

5.—“Shelley’s Debt to the Eighteenth Century,” by Prof. C. Pelham Edgar, Ph.D., of Toronto. Presented through Mr. Duncan C. Scott, and read by Dr. W. D. LeSueur. The philosophical views of Shelley are shown to have been largely moulded by William Godwin, the French Encyclopædists (especially d’Holbach and Helvetius), and Rousseau. A reaction, however, against the uncompromising radicalism of his youthful years is traceable in his latest writings.

6.—“Sydney Smith,” by Mr. George Murray. A sketch of the life and character of the eminent essayist, founded on recently-published materials.

7.—“Quebec: A Sonnet,” by the Rev. F. G. Scott.

8.—“Thalatta; A Poem,” by Mr. John Reade, read by Dr. Dawson.

9.—“Radisson in the Northwest, 1661-1663, by M. Benj. Sulte, of Section I. An attempt to trace the route followed by Radisson in his explorations of the years 1661-2-3, the author holding that in 1661 Radisson ascended the Ottawa, not the St. Lawrence.

The Rev. C. W. Gordon of Winnipeg, “Ralph Connor,” author of a number of notable works of fiction, and Mr. Henry J. Morgan of Ottawa, author of a number of valuable works of reference in Canadian biography and bibliography, were elected members of the section, and confirmed as such in a general meeting of the Society.

Mr. W. D. Lighthall called attention to the importance of endeavouring to secure legislation for the protection and preservation of historic sites, monuments, inscriptions, etc. A resolution was passed authorizing the President of the Section to confer with Section I on the subject with a view to joint action. A conference having been held accordingly, both sections united in a resolution to the effect that the Executive of the Society should be requested to bring the matter before the Dominion Government.

A letter was received and read from Sir Edward Mackenzie of Melbourne, Australia, expressing regret that he had not been able to complete in time for presentation his promised paper on "The Claim of Alexander Humphries, called Earl of Stirling, to the property of Sir William Alexander, Earl of Stirling."

The following officers were elected for the ensuing year:

President—Mr. W. D. Lighthall.

Vice-President—Mr. George Murray.

Secretary—Mr. William Wilfrid Campbell.

Printing Committee—Dr. S. E. Dawson, Dr. W. D. LeSueur, Mr. D. C. Scott.

W. D. LESUEUR,
Secretary pro-tem.

The following resolutions were then passed:—

Moved by Dr. S. E. Dawson, seconded by Dr. James Fletcher, and carried:

That the thanks of the Royal Society be tendered to the Maine Historical Society and to the Committee of Citizens of the St. Croix Valley; and that Rev. Dr. Bryce, Rev. Frederick Scott and Dr. Ami be a delegation to represent the Royal Society of Canada at the commemoration ceremonies to be held on June 25 at St. Croix Island.

Moved by Rev. Frederick George Scott, seconded by Prof. C. H. McLeod, and carried:

That the Royal Society expresses its appreciation of the kindness of the Board of School Trustees of the City of St. John in placing at its disposal the commodious High School building for the meetings of the Society during the present session.

Moved by Dr. Alex. Johnson, seconded by Rev. Dr. Bryce, and carried:

That the thanks of the Society be given to the Natural History, Loyalists, and Historical Societies of New Brunswick for the drive and picnic at Duck Cove, on Wednesday, June 22, and to the ladies of the reception committee for the bountiful lunch provided for the occasion.

Moved by Dr. Bailey, seconded by Dr. Fletcher, and carried:

That the Royal Society of Canada desires to express its appreciation of the action of the Dominion Government in extending a cordial invitation to the International Congress to hold its next triennial meeting in this country, and to thank the Government for its generosity in deputing Dr. Robt. Bell to attend the Congress at Vienna last August with authority to personally convey its invitation, in conjunction with that of this Society, and to offer on its behalf the liberal sum of twenty-five thousand dollars (\$25,000) towards defraying the cost of enter-

taining the Congress, should it accept the invitation. This Society also desires to express its regret that, notwithstanding Dr. Bell's efforts at Vienna, the Congress did not see fit to accept the invitation from Canada.

Moved by Mr. George Murray, seconded by Rev. Dr. Clark, and carried:.

That in view of the numerous engagements in the city for this evening the order in Section II for a Poet's evening at 8 o'clock be cancelled.

The following report was presented from Section IV:

Report of Section IV.

Section IV has the honour to report that four sessions of the section, each of much interest, have been held. The maximum attendance was ten members, with a number of visitors from other sections or from the general public.

Sixteen papers by members of the section were presented, of which three were read in full, and the remainder by title, the papers actually read awakening discussions of much interest and value.

The following gentlemen were chosen as officers of the section for the ensuing year:

President, Prof. Fowler.

Vice-President, Dr. Henry S. Poole.

Secretary, Mr. Lawrence Lambe.

The following resolutions were passed by the section:

(1) Moved by Dr. Fletcher, seconded by Dr. Matthew, That Section IV wish to express their appreciation of the valuable popular science lecture for the year, given by Dr. Ganong, which cannot but help very much the progress of botany in Canada.

(2) Moved by Dr. A. H. MacKay, seconded by Dr. Jas. Fowler, That the members of Section IV formally express their appreciation of the able way in which the annual volume of the Proceedings of the Royal Society has been edited by Dr. S. E. Dawson, the Honorary Secretary of the Society, and particularly wish to record their appreciation of the prompt way in which the separates have been distributed to authors.

(3) Section IV have pleasure in recording that they note with much interest the botanical collections on exhibition during the meeting from the graduating class of the High School of St. John, and congratulate the School Board of the city on the exceptionally good work of their teachers and pupils in this department of science.

(Signed) L. M. BAILEY,

Secretary pro tem.

LIST OF PAPERS.

1.—“Bibliography of Canadian Zoology, Exclusive of Entomology, for 1903,” by Dr. J. F. Whiteaves.

2.—“Bibliography of Canadian Entomology, for 1903,” by Rev. Dr. Bethune.

3.—“Influence des conditions Géographiques sur la météorologie à Québec,” by Abbé J. C. K. Laflamme.

4.—“The origin of Canadian Corundum,” by Dr. A. E. Barlow.

5.—“The Progress of Vertebrate Palæontology in Canada,” by Lawrence M. Lambe.

6.—“On the Squamoso-Parietal Crest of the Horned Dinosaurs *Centrosaurus Apertus* and *Monoclonius Canadensis* from the Cretaceous of Alberta,” by Lawrence M. Lambe.

7.—“A Classification of the North American Coniferales, to which are added certain Ginkgoales and Coniferales from Japan, and certain Cordaitales from Australia,” by Prof. D. P. Penhallow.

8.—“Notes on Tertiary Plants,” by Prof. D. P. Penhallow.

9.—“The Volcanic Rocks of New Brunswick,” by Dr. L. W. Bailey.

10.—“The Principal Sedimentary Formations in Canada and their Characteristic Faunas and Floras,” by Dr. H. M. Ami.

11.—“Bibliography of Canadian Geology and Palæontology,” by Dr. H. M. Ami.

12.—“Phenological Observations of Canada, 1903.” (To be included in Report of Botanical Club of Canada.) By Dr. A. H. MacKay.

13.—“Botanical Bibliography of Canada, 1903,” by Dr. A. H. MacKay.

14.—“The Study of Canadian Fungi: a Review,” by Dr. G. U. Hay.

15.—“New Species of Batrachian Foot-prints of the Carboniferous System in Eastern Canada,” by Dr. G. F. Matthew.

16.—“Sketch of the Life and Work of Professor E. J. Chapman,” by Dr. H. M. Ami.

The Loyalist Society of New Brunswick made a report through Dr. Stockton.

The Literary and Historical Society of Quebec reported through Rev. Frederick George Scott.

The Committee on nominations reported the following recommendations:—

For President—B. Sulte.

For Vice-President—Dr. Alex. Johnson.

For Secretary—Dr. S. E. Dawson.

For Treasurer—Dr. James Fletcher.

The following resolutions were then passed:

Moved by Sir Sandford Fleming, seconded by Rev. Dr. Clark and carried:

That Mr. Benjamin Sulte be President for the ensuing year.

Moved by Sir Sandford Fleming, seconded by Rev. Dr. Clark and carried:

That Dr. Alex. Johnson, Vice-Principal Emeritus of McGill University, be Vice-President for the ensuing year.

Moved by Sir Sandford Fleming, seconded by Dr. Ami and carried:

That Dr. S. E. Dawson be Honorary Secretary for the ensuing year.

Moved by Sir Sandford Fleming, seconded by Mr. Thos. Macfarlane and carried:

That Dr. James Fletcher be Honorary Treasurer for the ensuing year.

Lieut.-Col. Denison then retired and Mr. Benjamin Sulte took the presidential chair and thanked the Society for the honour accorded him.

The Vice-President, Dr. Johnson, took his seat on the platform and expressed his thanks for his election.

A vote of thanks was then proposed and passed to the retiring president.

The following resolutions were then passed:

Moved by Dr. G. U. Hay, seconded by Dr. James Fletcher and carried:

That the hearty thanks of the Society be tendered to the Honorary Secretary, Dr. S. E. Dawson, in acknowledgment of his faithful and unremitting services in performing in such an admirable manner the duties of Secretary, and especially for the care he has taken in editing the volumes of Proceedings of this Society, and the prompt publication of separates.

Moved by the Rev. Frederick George Scott, seconded by the Rev. Dr. Bryce, and carried:

That the thanks of the Society be tendered to Dr. Fletcher for the admirable way in which he has performed the important and onerous duties of Treasurer.

There being no further business before the Society in General Session, the President declared the twenty-third meeting of the Royal Society closed.

APPENDIX A

THE UNITED EMPIRE LOYALISTS AND THEIR INFLUENCE
UPON THE HISTORY OF THIS CONTINENT

By LT.-COL. G. T. DENISON

President of the Royal Society of Canada

PRESIDENTIAL ADDRESS

In accordance with the usual custom, it devolves upon me, as President of the Royal Society, to deliver the Annual Address.

For the first few years after the foundation of this Society, the Presidential Addresses were mainly devoted to the duties and aims of the organization, and to pointing out how the members might perform useful services to science and literature. Of late years it has become customary for the President to deliver an address on some particular subject in reference to which he may have acquired special information, or to which he may have given special study and research.

I have been a member of this Society from its foundation, and during the twenty-two years which have since elapsed, I have been the only soldier in its ranks. The justification for my appointment to the English literature section being the fact that I had written books of a military and historical character. I have chosen, therefore, a subject connected with my own line of thought, and will refer briefly to the United Empire Loyalists of the Revolution, and to the influence which they have exerted upon the history of this continent.

As a descendant of one of those Loyalists who landed in this place in May, 1783,—one of those who afterwards found their way into Upper Canada,—it will be appropriate and interesting for me, coming here among you, the descendants of those who remained in New Brunswick, to point out how loyally those who went to Upper Canada stood by the principles for which our common ancestors fought so strenuously, and for which they made such extraordinary and patriotic sacrifices.

The Loyalists, after being beaten in their struggle for the unity of the Empire, were driven out of the revolted colonies, and found their way to various portions of the British dominions. Many came to this province and to Nova Scotia, while many also migrated to Upper Canada, either directly, or by way of these provinces. They plunged into an almost unbroken wilderness, and for many years they had a hard and constant struggle against the forces of nature, and often against hunger and privations of all kinds. Mr. Leroy Hooker has well described their difficulties:

“They looked their last and got them out
Into the wilderness,
The stern old wilderness,
All dark and rude

And unsubdued;
The savage wilderness,
Where wild beasts howled
And Indians prowled;
The lonely wilderness
Where social joys must be forgot
And budding childhood grow untaught,
Where hopeless hunger might assail
Should autumn's promised fruitage fail,
Where sickness, unrestrained by skill,
Might slay their dear ones at its will,
Where they must lay
Their dead away,
Without the man of God to say
The sad, sweet words, so dear to men,
Of resurrection hope. But then,
'Twas British wilderness,
Where they might sing
God save the King,
And live protected by his laws,
And loyally uphold his cause."

They had no villages, no roads, no postal arrangements, no newspapers, no books, neither the leisure for, nor the possibility of, recording their opinions or principles, or of placing before the world their side of the great cause for which they had fought, and given up everything.

The Loyalists arrived in Upper Canada in 1784. The first literary production published in that province was printed at Kingston in 1824. It was a short novel, called "St. Ursula's Convent, or The English Nun." The only copy known to exist of this book, was secured by Dr. Bain for the Toronto Public Library, a few months since, at the sale of Senator Masson's library. The next book was a small poem published in 1826. The first work of a historical character ever printed in Upper Canada, was Thompson's "History of the War of 1812," published at Niagara, in 1832. It will be seen, therefore, that for nearly fifty years after the old Loyalists settled in Upper Canada, there were practically no facilities for publishing books, or for placing them before the public.

There were, of course, no literary papers or journals available either, and from the difficulty of communication and the breaking off of all the old ties, there was very little correspondence kept up which

might have thrown light upon the feelings of these loyal old founders of our country. Deeds speak, however, and I wish to point out the great and beneficial influence exerted by these sturdy but silent fathers of our people.

Their history has been written by their enemies. The first work on the U. E. Loyalists was by Lorenzo Sabine, a citizen of the United States, who tried to be fair, but whose bias is shown in many places. It was not till 1879 that Dr. Ryerson published his book on the "Loyalists and their Times," written from the loyal standpoint, by a descendant of one of the most distinguished of the exiles.

It is very gratifying to find that during the last few years literary men in the United States, of high character and great ability, have been making careful research into the records preserved in that country, and are writing historical works which, for the first time, do justice to those who stood true to their King and Constitution in the troublous times of the Revolution.

Professor Moses Coit Tyler wrote several magazine articles, and a book upon the literature of the Revolution. He was the first, I believe, among United States authors, to recognize that there was a justification for the Loyalist position.

Van Tyne's "Loyalists of the American Revolution" is also a valuable contribution to the history of the Loyalists, and is fair and impartial in its treatment of the question. Professor Flick's book on "Loyalism in New York during the Revolution," is also a most valuable contribution to the history of the time. These three writers, who base their statements, after careful research, upon original sources of information, give a striking picture of the origin and growth of the Revolution, and of the causes which led to its successful termination.

The Revolution began by agitation on the part of the lawless elements, against some of the steps taken by the Imperial Government, to obtain from the Colonies a small contribution towards defraying the enormous expenses which had been incurred by the Mother Country, in the long wars waged to defend the rights and existence of the Colonies themselves. The Stamp Act was passed in 1765, and although it was soon repealed and never properly put into force, it served as a pretext for the unruly classes to commence a movement against Great Britain. The subsequent determination of the British Government to tax tea, added fuel to the flame, and gave the disaffected classes the weapon they needed to help on their designs. These lawless elements were led by impecunious lawyers and unsuccessful merchants, by ship owners who lived by smuggling, and by men on the verge of bankruptcy. John Hancock, the first to sign the Declaration of Independence, was defend-

dant in suits of the Crown to recover nearly half a million dollars for penalties, at the time of the first fighting at Lexington. Professor Flick quotes a statement that "republicans, smugglers, debtors, and "men of desperate fortunes, were the principal promoters of this unnatural rebellion," and another, "that of the seventy men who issued the Declaration of Independence, all but eight or nine were deeply in debt, or very poor, and hoped for great benefit from the change."

Men of this class, by appealing to the mob, on behalf of the liberties of America, easily obtained the support of that class of the people who paid no taxes. The law-abiding, respectable, well to do classes appear to have held aloof from the agitators, and to have relied upon the constitutional authorities to uphold the law, and to check a movement which destroyed the rights of property, and soon upset all law and order.

The disloyal party was immensely assisted by the unwise, injudicious conduct of the British Government, and by the apathy and extraordinary lack of foresight or judgment, on the part of the Loyalists at the beginning. When the war broke out the mismanagement, lack of ability, and almost corrupt negligence of the British generals, did more to secure the success of the Revolution, than either the ability of Washington, or the efforts of his followers.

This negligence and mismanagement gave the Revolutionary party such confidence and enabled them so to increase their strength and organization, that it encouraged France, Spain and Holland to combine to aid the rebels actively. The conjunction of the fleets of these powers enabled them to secure the command of the sea for the time, and so destroyed all hope of the Mother Country succeeding in the struggle.

The Home Government should have sent troops at once, in great strength, to uphold the courts of law and prevent the petty acts of lawlessness which at first were the only evidences of rebellion. They should also have done away with the grievances. But instead of this, they adopted the impolitic course of passing laws intended to punish the malcontents, but which punished the loyal and disloyal alike, and they passed these laws without at the same time sending sufficient troops to enforce their decrees, or to protect those respectable classes who were willing to obey them. This led to the discontent spreading, and placed weapons in the hands of the disloyal party, while it annoyed the loyalists and rendered them still more helpless.

The fatal mistake of the loyalist party was that they never organized and that they relied absolutely on constituted authority to preserve order, and protect their persons and property. This gave the Sons of Liberty full freedom to tyrannize over and oppress all who would not

join them. Mobs attacked peaceable citizens, destroyed their furniture, smashed their windows, painted their cattle, and maltreated them personally in the most cruel and heartless manner. The whole community became so terrorized that the disloyal had their own way, until after the arrival of the British troops. Then, when it was too late, the Loyalists had a chance to organize, but even then they were handicapped by the extraordinary inefficiency and want of judgment of the British authorities.

Van Tyne says that many of the Loyalists would gladly have taken up arms when General Howe arrived with his army, "but were deterred by the lack of encouragement," and he goes on to say, "The British clung stubbornly to the idea that these provincials could not fight, and only encouraged their services in the regular army, where they might be trained by British officers. It took several years to recognize their value as provincial militia." Van Tyne adds that afterwards when it was too late, loyalist assistance was encouraged, and that about 50,000 soldiers altogether were drawn into the struggle, from the American sympathizers.

History repeats itself! In South Africa, in the early part of the war, the local volunteers were discouraged, and in some instances, it is said, disbanded and sent to their homes, the feeling being that they would be rather a hindrance than a help. A few defeats led to the call for the assistance of provincials, not only from all the South African colonies, but from all the great colonies. What a blessing it was for our Empire, that foreign intervention had not been encouraged in the interval, by the severe losses that our army sustained.

General Howe not only refused loyalist help, but he frittered away a whole winter in Philadelphia, wasting his time in dissipation and social entertainments, while Washington was at Valley Forge, only a day's march away, holding the dispirited remnants of his army together with the utmost difficulty. Howe could have scattered the rebel forces, and probably ended the war in two or three days by one well-planned, decisive action.

Professor Tyler gives a vivid picture of the incapacity of General Howe. He says:—

"It is well known that Sir Wm. Howe, having, in his rather tardy campaign for that year, gained, almost in spite of himself, a brief succession of victories over the American rebels, then forbore to take advantage of people thus fallen through his agency into depressed circumstances, and finding Philadelphia an extremely agreeable place of repose for a warrior who had already had enough of war for that particular season, he concluded to settle himself down in that gracious

“city, there to await with his officers and men, the arrival of the next summer’s campaign. Thenceforward during all the autumn and winter and the spring, he refrained as much as possible from aggressive military enterprises, which, besides being likely to prove disagreeable to the Americans, would have brought, of course, some inconvenience upon himself. This mighty general had, indeed, a truly martial fondness for the smiles of pretty women, for balls and routs, for dinners, theatricals, heavy gaming and heavy drinking; and he chose to dedicate those flying hours which were given to him in Philadelphia, to that mode of existence which the moralists have been wont to describe as riotous living.”

“With a military sybarite like this in Philadelphia, the surrounding inhabitants who had at first regarded him and his army with no little terror, soon came to regard both with some derision.”

Howe might have crushed the rebellion and prevented foreign interference, but he let the precious moments pass, never to return. Then came the intervention of three of the great powers of the age, and the game was up.

The effect of this has never been fully appreciated in the United States; they claim the credit of the success for themselves, but we must remember that France was at the summit of her greatness in the reign of Louis 14th, and still retained great power and prestige when, in 1778, she declared war against Great Britain. Spain still ranked as a first-class power, with all her great colonial Empire intact, and Holland was still a maritime nation of considerable strength, with the proud traditions of the time when her celebrated Admiral Van Tromp sailed up the Channel with a broom at his mast-head. Such was the combination which Great Britain and Ireland, with a population of about 12,000,000, had to fight, and when the Count de Grasse, with the allied fleet, secured the temporary command of the sea by his superior force, it led to the surrender of Lord Cornwallis and the war was then practically over.

When the struggle ended, the rebels had absolute control, and used the power they had acquired in the harshest spirit against those of their fellow countrymen who had opposed them, and drove away into exile all except the humblest and most temporising among them.

It is interesting to consider what the United States lost by this expulsion of the defeated party. Mr. Wm. Kirby describes them with great eloquence:

“They formed undoubtedly the best and wealthiest class in the old colonies. But all classes were present among them,—judges, lawyers, legislators, clergymen, soldiers, merchants, yeomen and handicraft men

—all filled the ranks of that emigration. Christian men of all the Churches were there, but not one infidel of the type of that arch traitor Tom Paine! He belonged emphatically to the rebellion. The Loyalists came with their Penates, their household gods, their bibles, the sacred communion vessels of their altars, the tables of the ten commandments from the chancels of their churches, these sacred objects they brought with them out of their abandoned temples. * * * * * And these ten commandments they set up anew in the rude churches which they built to the worship of God in Canada.”

Let us consider the influence which these Loyalists exerted, first upon the social life of the people in the British provinces where they settled, and secondly upon the political history of this continent.

The Loyalists held as their great doctrine, as the foremost article of their creed, the scriptural injunction, “Fear God! Honour the King!” This was their simple faith, to fear God, or in other words to obey His commands, and live righteously; to honour the King, that is, to obey the laws and support the constitution of the country, and to stand true to their allegiance to their Sovereign. The result of this spirit is shown in the remarkable freedom from crime of this country in its early years. The pious, God-fearing men who had made such sacrifices for their principles, were a community almost free from crime. Murders and theft were practically unknown, and for many years the country increased in strength and population, almost without need of legal restrictions or regulations. This tendency to avoid crime has always been more marked in Canada than in almost any other country, and has been a peculiarity of our new settlements in the Northwest Territories.

This has been in marked contrast to the state of affairs for the last hundred years in the western borders of civilization in the United States. This may be attributed to a great extent to the habits and traditions of the choice, picked men who came here and founded our country so well.

On the other side of the line the lawless elements had got control. They had set law and order and government and constitution at defiance. The rights of property were set at naught. As one of their writers has well said: “The Loyalists had position and property, the Indians had fertile lands; both were coveted, and both were wrenched from their rightful possessors.” Many of the Loyalists were put to death, the others exiled, and the property of all confiscated. This spirit has affected the nation ever since. The murders per annum in proportion to the population, being many times more than in the other countries of the world. The number of lynchings are about equal to

the number of legal executions, and are often accompanied by the most barbarous scenes. Yet they seem to be accepted by public opinion as an unavoidable evil. In many other ways in everyday life, one could point out the great advantage that we Canadians are all deriving to-day, from the honourable and law-abiding example set us by our Loyalist fathers, and the influence that it has had and continues to have upon the social life of our people.

It is a great blessing to us all that we live in a country where the laws are honestly administered, where justice is not bought, where crimes are punished, where life and property are secure, and where we enjoy as much real liberty as any people on earth. It is due to the law-abiding British sentiment of our people, brought here by our fathers and handed down to their children, that we possess all these inestimable advantages which we do not fully value, because we accept them as a matter of course.

The United Empire Loyalists have also exerted a great influence on the political history of this continent.

Nova Scotia, as I have said, was mainly founded by the Loyalists, so was New Brunswick, and so also was Upper Canada. The latter was in a somewhat different position from the other provinces. The loyal fighting men of the Revolution, those who came first to Canada, were the stern, unyielding, determined supporters of their King and Constitution, men in whom loyalty was a creed, a duty to both God and man.

These men settled, some in Glengarry county, and along the St. Lawrence, some in the Bay of Quinté District, some about Toronto in the Home District, many in the Niagara District, and some in Norfolk county and along the shore of Lake Erie. Lt.-Governor Simcoe, in order to increase the settlement of the Upper Province, and in the hope of drawing from the United States some of those lukewarm loyalists who had remained behind, established a most liberal system of land grants to incoming settlers. The immunity from Indian attacks which British fair and kindly treatment of the original tribes had secured to those living under the British flag, as well as the advantageous land regulations, brought a number of settlers from the United States who cared little or nothing for national sentiment, and did not care under which flag they lived. In twenty years these two classes were almost equal in numbers, the loyalists being recruited by settlers from the Old Country who had settled in Canada from a desire still to retain their allegiance, and live under their own flag.

This was the condition of affairs in Canada in 1812, at the opening of the war with the United States. Nova Scotia and New Brunswick

were comparatively safe, owing to the fact that Great Britain held the command of the sea. The universal loyalist feeling of the people was also a great security. Quebec, that impregnable stronghold, gave us a firm grasp upon the eastern portion of Lower Canada, while the staunch loyalty of our French Canadian fellow countrymen, under the enthusiastic leadership of their clergy, made that province with its much larger population, more secure.

The point of danger, the turning point of the whole war, was Upper Canada. It was situated nearer to the main population and resources of the United States; it was much more open to attack, and it had a scattered population of about 70,000, of whom only 11,000 were able-bodied men, capable of bearing arms. The neighbourhood of the St. Lawrence, and the other districts I have mentioned as having been settled by U. E. Loyalists, could only supply a portion of these 11,000 available men. A considerable number were new comers from the States, either lukewarm or actively hostile.

General Brock was at the head of affairs, not only commanding the British forces, 1,500 strong, but he was the civil Lt.-Governor as well. He saw at once the danger. Indeed he had foreseen it years before it came. He tried to get the militia effectively organized, which he had to do practically without money, depending mainly upon the loyal spirit of the people. The disloyal were a great trial and danger to him. The politicians in the United States counted absolutely upon the disaffection of many of the inhabitants of Upper Canada. The United States Secretary of State for War, Dr. Eustis, said, "We can take the Canadas without soldiers; we have only to send officers into the provinces, and the people, disaffected towards their own Government, will rally around our standard." Emissaries from the United States had for years been insidiously encouraging disaffection and spreading doubt and hesitation among the people. The reports of these men, and newspaper articles based upon them, which were published in the neighbouring republic, prove to what an extent disloyalty had taken hold among these later settlers.

The worst and most dangerous feature of all, however, was the disaffection that was shown in the Parliament of the Province by many of the members. The opposition, led by Willcocks, Mallory and Marcle, was absolutely treasonable in its action, and the three leaders shortly after, at the outbreak of the war, deserted to the enemy. Both Willcocks and Mallory afterwards fought against Canada in the enemy's ranks.

The House of Assembly was so nearly divided that General Brock could get nothing done. He appealed to the militia of York (Toronto),

mainly U. E. Loyalists and their descendants, and asked them if they would stand by him and follow him anywhere in the Province, or out of it, in its defence. They responded to his appeal with enthusiasm, and agreed to follow him anywhere. He then boldly faced the difficulty. He called his executive council together on the 3rd August, 1812, and gave them his views upon the situation, and the action which he proposed to take. This minute, which he laid before his council, gives such a vivid picture of his difficulties that I quote it in full:

"That the House of Assembly, instead of prompt exertions to strengthen his hands for the government of the militia, providing for security from internal treason by the partial suspension of the Habeas Corpus Act, authorizing a partial exercise of martial law concurrently with the ordinary course of justice, and placing at his disposal the funds not actually applied of the past appropriation, had consumed eight days in carrying a single measure of party, the repeal of the School Bill, and passing an Act for the public disclosure of treasonable practices before the magistrates should have the power to commit without bail. That under these circumstances little could be expected from a prolonged session. The enemy had invaded and taken post in the Western district, was multiplying daily his preparations to invade in others, that the militia in a perfect state of insubordination, had withdrawn from the ranks in actual service, had refused to march when legally commanded, to reinforce a detachment of regular forces for the relief of Amherstburg, had insulted their officers, and some not immediately embodied had manifested in many instances a treasonable spirit of mutiny and disaffection. That the Indians on Grand River, tampered with by disaffected whites, had withdrawn from their volunteer services, and declared for a neutrality, which was equally inadmissible as with the King's other subjects. That in the Western and London districts several persons had negotiated with the enemy's commander, hailing his arrival and pledging their support. That the King's forces consisted of the 41st, 900 strong, part of the Royal Newfoundland, 200, with a detachment of Royal Artillery and several vessels. That the extent of coast and distance of prominent parts would divide that force to support and countenance the militia. That the conduct of the Western militia had exposed the regulars at Amherstburg and he had made a large detachment of the 41st with militia from the Home and Niagara districts. That the Commandant at St. Joseph's had taken Mackinac, and might descend to Amherstburg and compel the invaders to retreat, with the aid of the detachment now on the march to Long Point, but that no good result could be expected unless he had power to restrain the militia and general population from treasonable

adherence to the enemy, or neutrality, by summary procedure—asked—whether it would be expedient to prorogue the House of Assembly and proclaim martial law?"

The Council adjourned until the next day, and then decided to prorogue the House and declare martial law. On the 5th August this was done. This was in all probability the turning point in the history of this continent. Had Brock been a weak man, or had his loyalist militia shown any lack of enthusiasm in backing him up, Upper Canada would have been lost. Sir George Prevost, a weak, incompetent man, seemed willing to abandon the province. The Executive Council were mainly of U. E. Loyalist descent and they stood by Brock under circumstances calculated to appall the strongest heart.

General Brock was now master of the situation, and the change in the aspect of affairs in 12 days was almost miraculous. A stirring address to the people went forth on the same day. On the 6th Brock left for Amherstburg. On the morning of the 16th August he crossed the river with 1,330 men, and captured Detroit, with the whole of General Hull's army of 2,500 men, and their immense stores of supplies and munitions of war, which he needed urgently to help arm the militia. On the 13th October following, the brilliant victory of Queenston Heights was won, at the cost of Brock's life. Here again at his heels were the loyalist militia, his last words of encouragement being given to the York volunteers, who had also been with him at Detroit.

To show under what circumstances Brock and his followers fought to retain Canada for the British Crown, I may mention that when he set out from Fort George, on the morning of the victory of Queenston Heights, he left in prison under the guard of a few old soldiers, as large a number of traitors and aliens as he had altogether of loyal soldiers under his command, when he made his charge upon the Heights before the reinforcements came up.

These two victories, Detroit and Queenston Heights, settled the fate of the war. They inspired the loyal, they overawed the disloyal, they gave a confidence to our soldiers which they did not lose through all the fighting, and in the subsequent victories the regiments of loyalist militia, with their British comrades, did yeoman service, and after a most arduous struggle preserved Canada to the British flag.

Can anyone say that our Loyalist fathers and their sons, in this crisis, did not exert an immense influence upon the history of this continent?

The next crisis in the affairs of Upper Canada occurred in 1837, when owing to the agitation of a few newcomers, and some descendants of those who were lukewarm in 1812, an attempt was made to throw off

the connection with Great Britain, and establish a republic. There were no British soldiers in the Province, but Sir Francis Bond Head, the Lt.-Governor, did not have to appeal to the loyal inhabitants to support him. They poured into Toronto spontaneously, from every direction, in such numbers, to uphold law and order, that the rebels were dispersed at once. In various places where trouble arose, the malcontents were promptly put down.

The striking point about this rising of the loyal population, in defence of law and order, is the extraordinary contrast between the prompt and vigorous action of the loyal people, and the apathy and slowness of the same class in the early days of the American Revolution. Men did not wait for orders, but gathered in groups all over the Province, and without uniforms, but with their own shot guns and rifles, after electing their own officers, came pouring into Toronto in such numbers that the Governor had to issue a proclamation telling them to go back to their homes. We fancy we can see in this, that the traditions of the Revolution had taught the loyal men of 1837 not to depend upon constituted authority, but at once to set to work themselves, to defend the interests of their Queen and country. Had the loyal men gathered on the day of the first fighting at Lexington in 1775, and poured into Boston in the same way, the Revolution would not have been a success.

Mr. John A. Macdonell, in his "Sketches in Glengarry," draws attention to the fact that those districts in Upper Canada, where in 1812 the militia were disloyal and wavering, were the same districts in which the later settlers from the United States had taken up lands. These same districts were the centres of rebellion in 1837. He gives a list of the numbers arrested for disloyalty from the 5th December, 1837, until the 1st November, 1838. In the Eastern, Ottawa, Bathurst and Prince Edward districts, settled by the U. E. Loyalists or disbanded soldiers, there were no rebels to arrest. In the Johnston District there were 8; Midland, 75; Newcastle, 12; Home District, 422; Niagara, 43; Gore, 90; London, 163; Western, 11. The rebellion did not arise among the descendants of the U. E. Loyalists, but mainly in the other districts, and it was suppressed by the Loyalists without the aid of regular soldiers.

Once more the United Empire Loyalist spirit had its influence upon the history of this country, and helped to preserve Canada to the British Crown.

In 1842, at the time of the Maine boundary dispute, Governor Fairfield threatened hostile operations. The loyalists of New Brunswick stood firm while the Legislature of Nova Scotia, representing the same breed of staunch defenders of British institutions, at once placed

all their militia and all their revenues at the disposal of the Government, to aid their sister province in defending her rights. This bold and determined action prevented war, and once more the same old spirit had its influence.

In the Fenian Raid of 1866 the militia forces of New Brunswick rallied to the flag with enthusiasm, as did those of the sister provinces of Ontario and Quebec, and the invaders were soon driven out of our borders. In the Trent affair the Canadian people showed the most loyal spirit, and their determined attitude probably prevented war and all its attendant calamities. All these episodes indicate the great influence the U. E. Loyalists have had in our military affairs.

If we turn to civil and commercial matters we can see that the traditions of the old Loyalists and the sentiments handed down by them to their descendants, have exercised a very decided influence on this continent. The Canadian people received a severe blow to their trade through the fiscal revolution in Great Britain about the year 1846, and the loss that Canada suffered by the abolition of the preferences her products had formerly held in the British market. A good deal of dissatisfaction was felt, and in the year 1849 some hundreds of the leading business men of Montreal signed a manifesto advocating annexation to the United States. This aroused strong opposition in Upper Canada, and public opinion soon manifested itself in a way to show that no pecuniary losses would shake the deep-seated loyalty of the Canadian people. The movement in favour of annexation withered at once.

The Reciprocity Treaty of 1854 was abrogated by the United States in 1866, the two years' notice having been previously given. This also caused some murmuring, and some little talk of annexation, but the people loyally turned to the confederation of the provinces and the opening up of new markets. Once more the spirit of the old Loyalists had its influence.

In 1887 a very insidious scheme was evolved in New York, and with the assistance of a few people in Canada, was launched in favour of a Commercial Union between the United States and this country. This proposition at first was favourably received. The great prosperity which had been enjoyed by Canada during the existence of the old Reciprocity treaty, had caused a general feeling among the people that this prosperity was the result of the treaty, when, in reality, it was due for a time to the Crimean War, which raised the price of wheat to nearly double, and caused a keen demand at high prices for all that Canada could produce. The large expenditure of money in railroad development, which took place from 1856 to 1860, also made trade very

flourishing, and for the remaining years of the term of the treaty a great war was being waged in the United States, which weakened their competition with us in other markets, and gave us a ready sale, at war prices, in their markets for almost everything we had to sell. The average citizen at first thought favourably of Commercial Union. The Loyalist element was not asleep, however, and it was soon felt that an entanglement such as Commercial Union would necessarily involve, would in the long run be likely to end in the annexation or absorption of Canada. This was contrary to the dream of the Loyalists of the Revolution. They fought for a United Empire—a United British Empire. For that idea they had made all their sacrifices, for that they and their descendants had always stood true to their Sovereign and to British institutions. This same idea animated all other loyal Canadians, and a movement in favour of a Commercial Union, or a system of mutual preferential tariffs, between Canada and the Mother Country, and the rest of the Empire, was soon started, and an appeal made to the people to adopt that policy in preference to any arrangement with the United States.

This proposition appealed at once to the feelings and instincts of the inhabitants of Canada, and soon the policy received very general support, and after some years of struggle and agitation and work, the Canadian Government adopted the principle and gave the preference to Great Britain. The movement originated in Canada, and has been pressed on by Canada. At the request of Canada the German-Belgian treaties were denounced. Canada took the lead in establishing Imperial penny postage, as well as in forcing on the construction of the all British Pacific cable.

All these movements are in the direct line of the dream of the old U. E. Loyalist fathers of our country, and no one can fail to see that their traditions and precepts and example, have, through the influence of their descendants, had a very considerable share in bringing about the present state of affairs. The movement has spread into the other colonies, and several of them have followed Canada's example.

The cause that Canada has made her own has been taken up in Great Britain, and strenuous efforts are being made to induce the Mother Country to meet these advances of her colonies and consolidate her possessions in such a way, as to preserve and secure the markets of the Empire for the Empire. The desire is to put a stop to the system by which every foreign nation is fostered and nurtured at the expense of the assets and resources of our Empire, which should be preserved and employed to strengthen and support the interests of our own race.

This is the great question of the day. The movement in favour of Imperial unity is of vital strength. It is similar to the feeling that consolidated Germany and united Italy. There is no other topic attracting so much attention and of so much importance, and it is really the question of endorsing and approving and endeavouring to carry into effect the principles for which the United Empire Loyalists struggled and fought. Here again we have another instance of the influence that these men are having upon the history of the British race.

Let us hope that before many years we may have a United Empire, if not confederated, at least organized into a constellation of allied nations, all banded together to aid each other in trade, in diplomacy and common defence, under the same Sovereign and under the same flag.

Canadians may well be proud of the founders of their country, and all classes should combine to perpetuate the principles which have guided us so well in the past.

“Stern was the test, and sorely prest,
That proved their blood best of the best;
And when for Canada you pray,
Implore kind Heaven
That like a leaven
The hero blood which then was given
May quicken in her veins alway;
That from those worthy sires may spring,
In number as the stars,
Strong-hearted sons, whose glorying
Shall be in Right,
Though recreant Might
Be strong against her in the fight
And many be her scars;
So, like the sun, her honoured name
Shall shine, to latest years the same.”

APPENDIX B

MARINE AND LAKE BIOLOGICAL STATIONS OF CANADA

MARINE AND LAKE BIOLOGICAL STATIONS OF CANADA.

ATLANTIC BIOLOGICAL STATION.

The Marine Biological Station of Canada was moved from Canso, N.S., in June, 1903, and was beached at an appropriate spot on the shore of Richmond Bay, Prince County, Prince Edward Island. The location is on the north-east side of the bay, near Kier's Wharf, Malpeque, and in proximity to the famous Malpeque oyster beds. An institution, such as this Marine Biological Station, whose motto is "Practice with Science," and which seeks along the various lines of scientific research to directly aid, enlighten, and stimulate those practically engaged in the utilization of maritime products, could not be placed in a more appropriate place than in the vicinity of Richmond Bay. When, in 1891, Mr. Kemp, Sen., and Mr. Ernest Kemp, oyster authorities, from Whitstable, Kent, England, made a survey of the oyster beds of Canada at the request of the Government, they stated in their report that "Richmond Bay was found to be nothing short of a gold mine. Some of the beds are extensive, comprising several acres, and the stock compares well with that of cultivated grounds. Its resources appear to be enormous, the beds being well stocked with oysters and brood, which were found to be of good quality and in healthy condition, and of rapid growth. In every part explored, where soil could be found, there were oysters and oyster brood. In no single instance were starfish or other enemies of the oyster met with, a most remarkable state of things upon such a large area of ground. A great number of hauls were made over different parts of the bay. Dead weeds and mud were only noted from Oyster Cove, including Indian River, to Rayner's Creek. The experts were informed that they would not find any beds there, as they had all been cut to pieces by mussel mud diggers, although at one time these were the best in the bay, as the fishermen could always work upon them on account of their being sheltered from strong winds. There were at least four miles of the beds destroyed. Several hauls were made off Mill's Point, McNeil's, Lock Shore, River Platt, Fraser's Cove, Narrows, Lot 12, Squirrel Creek, Niggers Point, Joe Benward's Point, Sally Francis, Cooper's, Bideford River, Schooner's Creek, Barclay's Creek, Front River, Bird Island and Enmore River with successful results. From the Bar to Bryant's Point, nothing but weeds and mud were found, although it is stated that originally the bed was half a

mile in length, but it has been completely destroyed by mussel mud diggers."

Mr. Ernest Kemp, in a later report, made special reference to the beds in the more northerly part of the bay, the part, indeed, which is receiving principal attention from the staff at the Biological Station. The report states that "on the northern portion of Richmond Bay, abreast of Curtain Island, the oysters are of a very fine quality and of large size; they are taken from deep beds, and are becoming very valuable. Large oyster beds are found in this locality in deep water (from 20 to 26 feet), where it is almost impossible to use tongs on account of the depth and current of the tides. I cannot see that dredging in moderation does any harm to these beds, but would improve, cleanse and extend them if a limited time were given to dredge them to fishermen who choose to catch oysters by that method. Oyster beds that have been previously dredged upon in this locality are now covered with small oysters, the most noticeable are the Sand, or Long bed, and the Townsend, or 40-acre patch; both these beds are now covered with small oysters, too small for market, and several fishermen state that dredging is the cause of the spat settling there, as the shells have been raked over and cleansed."

The productiveness and excellence of these oyster areas has been abundantly demonstrated by the thorough investigations carried on under Professor R. Ramsay Wright's skilled superintendence in 1903. The work detailed below will, without doubt, do much to improve the famous oyster beds in question, and will form an object-lesson for similar work on other favourable areas along the shores of the Maritime Provinces. The oyster industry of the Dominion has sunk to a low ebb, compared with the flourishing and remunerative state which it might readily attain. When it is recalled that so long ago as the reign of William IV. an Act was passed to put a stop to the practice of actually burning live oysters in order to produce lime for fertilizing farm lands, and it is barely twenty years since an eminent resident in Prince Edward Island, who affirmed that practically the whole shore of Prince Edward Island, fringed with innumerable creeks, the so-called mouths of rivers, present conditions under which oysters, from time immemorial, have propagated and prospered, did not hesitate to declare that it is only a question of a few years when the famous oyster industry would be a thing of the past. As an official report states:—

"Only about \$150,000 are annually produced in the provinces of Nova Scotia, New Brunswick and Prince Edward Island, fully two-thirds of which are taken in the last-named province. It is claimed

that, of all the oysters consumed in Canada less than one-third is supplied from native sources.

"There is no sufficient reason why the demand for oysters throughout the Dominion should not be supplied by our own people. The inland markets are easily accessible, and the domestic consumption would, no doubt, be increased if the article was produced and supplied with our own resources, at a lessened cost. The area of oyster grounds on the Canadian coasts is very extensive, and is situated in localities admirably adapted for the growth and nutrition of oysters. This mollusk has been found from Bay des Chaleurs to Bay Verte, in the following places, viz.: Between Caraquet Banks, at Caraquet, St. Simon, Shippegan Harbour and Gully, Tabusintac, Burnt Church, Bay du Vin, and many other places in Miramichi Bay; Kouchibouguac, Richibucto, Buctouche, Cocagne, Shediac and Bay Verte. In Nova Scotia, the oyster is found at River Philip, Pugwash, Tatamagouche, River John, Pictou, Tracadie, Mabou, Margaree, Sydney, Albert Bridge, Country Harbour, St. Mary's River, Liscomb Harbour, Jeddore Head, and nearly everywhere in the Bras d'Or Lakes. It is found around the whole coast of the Island of Prince Edward, and many places in British Columbia are also adapted for the growth and cultivation of oysters.

"In most of these places there are remnants of a stock which, for delicacy of flavour and nutritive properties, is not excelled by the choicest varieties grown and caught on the United States coasts. Along the whole tidal shores of Prince Edward Island, and New Brunswick especially, oysters of the finest description might be raised in enormous quantities were the natural facilities for their culture enhanced by a proper system of cultivation and protection. When it is borne in mind that the mother oyster yields 50,000,000 to 150,000,000 ova each season, some slight conception may be formed of the probable return from any careful system of cultivation if once properly carried out.

"In 1880, this industry yielded in the States \$13,403,852, eighty per cent of which came from Chesapeake Bay. This high state of productiveness was attained only by an economic use of existing oyster grounds, accompanied by careful and intelligent cultivation."

In the scientific experiments carried on, in connection with the Station, the Dominion Government's oyster steamer "Ostrea," in command of Captain Ernest Kemp, rendered most valuable assistance, and very thorough investigations into the physical and chemical characteristics of the sea-water on the oyster beds, including determinations of the salinity, specific gravity, temperature, etc., as well as the intricate biological conditions which obtained, were made. Professor J. J. Mackenzie, Professor of Pathology, University of Toronto, made a study of the

oyster from the bacteriological standpoint, while certain biological phases of the subject were taken up by Professor E. W. McBride, of McGill University, Montreal. The whole of the work, embracing also experiments in oyster culture on the fascine, tile and other systems, was under the direction and supervision of Professor Wright. Studies of the local fishes, their food, etc., were made, and some faunistic work of great interest, and the reports now in preparation for publication will be of the highest practical value to the country. The staff included many university men who had previously carried on researches at the station, and Dr. Joseph Stafford, with his accustomed zeal and skill, performed the duties of curator.

A full programme of work has been drawn up for the season of 1904, and the staff will include several workers from Maritime Province Universities, which have not hitherto been prominent in participating in the investigations carried on upon the sea-coast. The following subjects will be included in this season's researches:—

1. Plankton work; surface and bottom.
2. Pelagic ova and young of Teleosteans.
3. Continuation of last season's investigations on the oyster, its food, reproduction and local variations on the famous Malpeque oyster beds.
4. Further experiments in raising oysters by fascines, *viviers*, *claires*, etc.
5. The occurrence of smelt in the local streams, the schools of young and food at different stages.
6. Faunistic studies, especially fishes, a great variety of specimens available at some of the fishing stations along the shore.
7. Otter-trawl experiments in cod, haddock and hake fishing.
8. Experiments on the behaviour of lobsters in traps especially with regard to the entrance and exit of small, undersized lobsters.
9. Experiments in shad culture, and study of larval stages.
10. A study of the peculiar structures developed on tidal gauges, floats, materials for which will be provided by Dr. Bell Dawson.
11. Studies on the clam-beds, soft and hard shelled.
12. Inquiry into the depredations of dog-fish, and of the effects of the usual fisherman's methods of maiming and destroying.
13. Investigation of migration and occurrence of Striped Bass (*Roccus lineatus*, Bloch).
14. Examination into qualities of frozen and fresh bait (herring and squid).
15. Pollution of streams and fishing grounds.

The station is still hampered in an important branch of its work, viz.: the survey of deep-sea fishing grounds, through lack of a specially built steamer, such as most Government stations of the kind in other countries possess. The need of such a research steamer has been specially felt at Malpeque, which is some distance from the cod, haddock and mackerel fishing grounds, and if the station is moved, as is likely, to some more northerly location, in the Bay of Chaleur, or still nearer the St. Lawrence river, the need of such a vessel will become still more pressing.

The work of the Canadian Station continues to attract notice abroad. The French, German and United States Governments have desired copies of the reports, already published, of the biological work completed, and the Government of New South Wales, and the fishery authorities in New Zealand, have recently made similar requests. An important series of papers and reports are on the eve of completion, and will be issued as soon as possible.

THE BIOLOGICAL STATION AT THE MOUTH OF THE GO-HOME RIVER— GEORGIAN BAY.

This important inland biological station has continued to successfully carry on the fishery and other researches, in the waters of Georgian Bay, commenced three years ago. Dr. B. Arthur Bensley was entrusted with the main direction of the work, and a number of university men have ably aided in the faunistic studies, the collection and identification of the fishes in the adjacent waters, which had occupied the staff in the preceding seasons, amongst other important work done. The detailed and accurate hydrographic survey which Professor C. H. C. Wright, B.A.Sc., of the Faculty of Applied Science, had supervised, was brought to a completion during the season, and a large chart has been forwarded to the Marine and Fisheries Department through the Rev. Chancellor Burwash, of Victoria University, who has been prominently associated with the station since its inception. A very extensive series of specimens of young black bass, at various ages, and of other fish, has been made, with the object of determining the rate of growth, the food at various ages, and the changes in the form and external appearance of the young. The collection, beautifully preserved, has for safety been stored in Toronto, in the store-rooms of the Biological Department of the University and as it is one of the largest ever made in the inland waters of Canada, it will form the nucleus for a national collection of fresh-water fishes, when such a collection can be suitably accommodated in Ottawa.

The breeding of that valuable game and food fish, the black bass, received much attention, and some new observations of great practical value were made. The compilation and completion of reports upon the researches carried on involve time, and it is anticipated that certain reports will be sufficiently advanced this season to justify publication separately or along with the "Contributions to Canadian Biology," which the Marine Biological Station issues. During the season 1904 lines of study will be pursued of vital importance to the great lake fisheries.

APPENDIX C

SURVEYS OF TIDES AND CURRENTS IN CANADIAN WATERS

SURVEYS OF TIDES AND CURRENTS IN CANADIAN WATERS.

Tidal and Current Survey.

In this survey, an important advance has been made by the purchase of the steamer *Gulnare* to enable the investigation of the currents to be resumed. The region requiring most immediate investigation was taken up to begin with; namely, the waters around the south-eastern coasts of Newfoundland, on the line of our most frequented steamship route. The currents in this region were examined last season, from May to September, under the personal supervision of Dr. W. B. Dawson, the engineer in charge of the Survey. Special attention was given to the question of indraught into the larger bays on the south coast, and to the behaviour of the Polar current which follows the eastern coast. For this work the D. G. S. *Gulnare* was equipped with appliances for deep sea anchorage, and apparatus of a modern type, in some ways specially devised for the purpose. At anchorages carefully chosen, the speed of the currents was measured, and the direction noted every half hour, day and night. The observations also included the under-current, the density and temperature of the water, the mileage and direction of the wind, and a continuous record of the tide on a self-registering gauge placed in a harbour in the region, for comparison with the set of the current. Solar azimuth observations were also taken to determine the magnetic variation.

The behaviour of these currents is very varied, and they were found to be so weak as to be readily influenced by the wind; but by a systematic reduction of the results, Dr. Dawson has prepared a report which describes the currents as concisely as possible, while avoiding technicalities. It may be allowable to note briefly some of the results, which are of more general interest from a hydrographic point of view.

Nature of the Currents.—The currents are almost invariably less than one knot. As a rule, they veered widely and were irregular in direction; and with so low a speed they were readily influenced by the wind. There were three elements to distinguish:—(1) Any general tendency to set in one direction more than in others. (2) Any tidal influence, which might show itself either as a marked change in the direction of the set, or as a period in which a variation in velocity would recur. (3) The influence of the wind in disturbing the usual behaviour

of the current. From our observation, the effect of any storms which occur during the summer season seldom extends to a greater depth than 5 or 10 fathoms; and it was therefore found that the behaviour of the under-current at 15 to 30 fathoms afforded a most valuable indication of the normal character of the current. In these currents, the tidal element is almost invariably present in some form, more or less distinct; and this is almost always combined with a tendency to make on the whole in some one direction. It is not therefore possible to maintain an arbitrary distinction between "constant currents" and "tidal streams"; but the only natural distinction is to use the term *current* for all horizontal movements of the water, and *tide* for the vertical movement from high to low water.

The following features in the behaviour of these currents have now been ascertained by the observations made:—(1) When more than five miles from shore, there are no currents at any time throughout the season which exceed one knot per hour in any direction. The only exception to this is the Polar current, in which a maximum speed of 1.15 knots was observed. (2) On the south coast, when within four or five miles of the shore, the current is chiefly governed by the tide, and sets in the two opposite directions alternately; but the farther out the point of observation, the greater the tendency for the direction of the current to veer completely around the compass. (3) The water makes northwestward on the whole along the south shore, from Cape Race towards Placentia Bay; that is to say, when a long average is taken, the set is more frequently in that direction than in any other. (4) With regard to indraught towards the bays, the water makes inwards on the whole on the eastern side of Placentia Bay in the same sense that it makes northwestward along the south coast. A corresponding indraught is felt at certain times of the tide, on the east side of St. Mary's Bay. As already noted regarding the currents in general, these indraughts do not exceed one knot at an offing of five miles. (5) The Polar current sets very constantly to the southwest for a width of 30 or 40 miles off the eastern coast. During times of disturbance, it may set southeastward, or even be reversed, on the surface. When such disturbance occurs, it is usually for part of a day immediately before a gale comes on.

Density and Temperature of the Water.—Extended observations of density and temperature were taken during the season. This was done in the hope of tracing the movement of the water, as this method had proved so serviceable in the Gulf of St. Lawrence. The density of the water was taken at the surface only. The variation did not prove sufficient, however, to be relied upon as an indication of direction of

movement. The temperature was taken to a depth of thirty fathoms; and more was expected from the temperature than from the density, as it was hoped it would serve to trace the course of the Polar current. The depth of thirty fathoms was found sufficient, as the water was there at the freezing point throughout the region examined, both south and east of Newfoundland, during the whole season from May to September. All the change which took place during the progress of the season or from other causes, was between the surface and thirty fathoms. The change of the temperature of the water also afforded an interesting valuation for the amount of wind disturbance, and the depth to which it extended, under given conditions.

Two results were arrived at, which made the temperature observations of little value for the purpose of tracing the movement of the water by its temperature, and which it will therefore be sufficient to mention briefly: (1) The temperature of the water at 30 fathoms is practically at the freezing point in all parts of this region, from the mouth of Placentia Bay to St. Johns. It varied only from $30\frac{1}{2}^{\circ}$ to 34° Fahr., and there was no change from one month to another, from May to September. (2) The water of the Polar current warms up quite as much on the surface as the surface water elsewhere in this region. The general increase of the surface temperature along the south shore, from St. Pierre to Trepassey, was from $36\frac{1}{2}^{\circ}$ in May to 50° in September; and the surface temperature of the Polar current rose from an average of $34\frac{1}{2}^{\circ}$ at the end of May to $50\frac{1}{4}^{\circ}$ at the middle of August. Whether this increase of the surface temperature takes place during the progress of the current southward, or whether this warmer surface water flows over it from elsewhere, we have not sufficiently extended observations to determine. But for the guidance of the mariner, it is evident that the lower temperature cannot be depended on, as an indication of the current-belt itself.

Wind Influence.—It would be quite erroneous to suppose that the wind always causes a drift in its own direction. On the contrary, the set is primarily due to the nature of the current; and if it has any definite direction of its own, owing to the tide or other causes, it takes a strong wind a considerable time to overcome this, even with currents such as these, which do not exceed one knot.

A set of the current towards the point from which a wind is about to come is in accord with the universal testimony of the fishermen throughout these regions. Of all the signs of bad weather, it is the one which they appear to find the most trustworthy. In the summer, bad weather usually comes from the S.E. and "blows itself out" from that direction; but later on, in the autumn, the wind chops round to

the N.W. before the storm is over. Along the south shore, it is only during ebb tide that there is a weak set to the S.E. Any strong set to the S.E. or S. is a sign of bad weather. The fishermen regard this as an unfailing indication, and at once run for shelter. The main feature is the fact of the current setting "into the weather" as they express it; and it is difficult to give a satisfactory explanation for this. The actual direction of the current is necessarily modified by local conditions and guided by the trend of the shore; but the greater scope and freedom the current has, the more directly it appears to set towards the coming wind. And further, it will set in either direction in accord with the expected wind. If this behaviour is due to difference of barometer, it is not easy to understand why the water should be the first to feel a change, before the wind itself begins to blow.

Tidal Observations.—In the tidal branch of the Survey, the seven principal tidal stations in Eastern Canada and Labrador have been continued in operation throughout the year without any serious interruption. Additional observations of the turn of the current in Northumberland Strait were also secured at Cape Traverse; and further tidal observations in that strait.

On the Pacific coast, the tidal observations have been continued at Sand Heads, Victoria, Bamfield in Barkley Sound, and Port Simpson. The extension of the observations there is gradually indicating the most rational subdivision of those waters into regions referable to the various tidal stations. All new results obtained from the observations are embodied in the tide tables.

Further reduction of tidal record from the principal stations, to improve the accuracy of the tide tables, is being made from year to year. For this, the height of the tide hour by hour throughout the year is required, as well as a careful preparation of the record in other ways. The tidal information for the Pacific coast meets with even more appreciation than the Atlantic tide tables.

The appropriation for this Survey was increased last year to \$22,500 to cover the cost of the maintenance of the new steamer, as well as the maintenance of the tidal stations and salaries of observers.

APPENDIX D

REPORTS OF ASSOCIATED SOCIETIES



REPORTS OF ASSOCIATED SOCIETIES.

I.—From *The Numismatic and Antiquarian Society of Montreal*, through JUDGE L. W. SICOTTE.

The Society during the past year has continued to augment its collections by the addition of a number of mementoes of Canadian history, of Canadian portraits and books relating to Canada. It has thus been able to save from destruction some things very important to Canadian archæology.

These additions were: Canadian antiquities, 68; coins and medals, 27. Portraits of eminent Canadians—Oils, 5; engravings, 10; photographs, 10. Canadian scenes—Water colours, 2; engravings, 8; photographs, 11. Canadian books, 13; pamphlets, 50; other books, 350; documents, 123; maps and plans, 10; and periodicals, 250.

On account of the inconveniences caused by the repairs to the building, the scientific researches of the members were somewhat hampered during the year. Still, the following papers were read:—

1.—“The First Canadian Agricultural Medal,” R. W. McLachlan.

2.—“An Account of a Company of Scottish Settlers in Washington County, N.Y.,” James Reed.

3.—“New Canadian Coins and Medals, 1903,” R. W. McLachlan.

4.—“Biographical Sketches of a Number of Celebrated Canadians,”
Hon. Justice Baby.

5.—“Early Renaissance Wood Carvings Found in an Old Church near Quebec,” W. D. Lighthall.

The efforts of the Society last year to prevent the imminent destruction of the Château de Ramesay were not only crowned with success, but they have resulted in a general consensus of opinion that the building should be retained in perpetuity in as near its original form as possible. The number of visitors has so continued to increase from year to year that it is now estimated at 100,000 annually.

The officers for 1904 are:—

President—Hon. Justice Baby.

Vice-Presidents.—L. W. Sicotte, W. D. Lighthall, C. T. Hart, L. G. A. Cressé, and James Reid.

Hon. Treasurer.—George Durnford.

Hon. Curator.—R. W. McLachlan.

Hon. Recording Secretary.—C. A. Harwood.

Corresponding Secretary.—Lewis Skaife.

Librarian.—J. A. U. Beaudry.

Council.—S. M. Baylis, P. O. Tremblay, J. B. Vallée, Dr. C. W. Wilson, J. C. A. Heriot, Ludger Gravel, Eugene Lafontaine, James Morgan and G. N. Moncel.

II.—From *The Miramichi Natural History Association*, through
Mr. J. L. STEWART.

Another year of considerable activity in the life of our Association has gone by, and your Council beg to present the following brief abstract of its proceedings and other matters connected therewith.

Membership.

The following is the present number of members:—

Honorary members	3
Members	40
Associate members	33
Corresponding members	11

Treasurer's Report.

Balance on hand, February, 1903	\$23.93
Membership fees, sale of bulletins, etc. . .	34.60
Government grant	99.75
	<hr/>
	\$158.28

Per Contra.

Current expenditure	\$33.18
Mounting birds and animals	23.00
Cases, shelving, etc.	60.00
	<hr/>
	\$116.18
	<hr/>
Balance on hand	\$ 42.10

Museum.

The various departments of the museum have grown during the year, so that steps are being taken to provide more cabinet space for the proper arrangement and preservation of these interesting collections.

When these cases, now in the course of construction, are placed in our rooms, rearrangement will be made which will render it more attractive and instructive.

The exhibit of Natural History objects made by the Association last September at the Chatham Provincial Exhibition, though comprising but a small portion of the material belonging to the Society, and hurriedly arranged, was greatly admired, and added a fresh attraction to the ordinary display.

The Summer School of Science of the Maritime Provinces, which held its session in Chatham in July and August, visited the museum, and found it useful to illustrate many of the subjects studied. The members of the school were also entertained at a reception given by the Association in its rooms, when many of the visitors spoke very highly of the evidences of activity and progress shown by the Association on every hand.

Library

A reference to the list of donations and exchanges will show how the library grows, and the urgent need of cases for the reception of books and magazines.

Books and pamphlets added to the Library between February, 1903, and 1904:—

"Transactions of the Ottawa Field Naturalists' Club," Vol XVI., No. 12; Vol. XVII., Nos. 1, 4, 5, 6, and 7.

"Bulletin of New York Botanical Garden," Vol. III., No. 9.

"Report of the Provincial Museum of Nova Scotia," Vol. II., No. 8, 1903.

"Phenological Observations in Nova Scotia and Canada, 1901."

"Transactions of the Natural History Society of Glasgow."

"Presidential Address of A. H. MacKay, LL.D., before the Nova Scotia Institute of Science."

"Building up a Canadian Nationality." G. W. T. Irving.

"Labrador Plants, etc." A. H. Motley, LL.D.

"Annual Report of Botanical Club of Canada, 1902 and 1903."

"Map of Canada." (Geological Survey of Canada).

"Catalogue of Canadian Birds." (Geological Survey of Canada).

"Systematic Study of Land Animals of N.A." (Natural Hist. Society of Boston).

"Metamorphosis of a Land Crab." (Natural Hist. Society of Boston).

"Records of the Australian Museum, Sydney."

"Annual Report of Historical and Scientific Society of Manitoba, 1902."

"Insectivorous Birds of Manitoba."

"Letters of a Pioneer of Manitoba, Alex. Ross."

"Report of Australian Museum."

"Report of the Boston Natural History Society."

Four Maps of the Northwest. (Dept. of Interior, Ottawa).

Donations—1903 and 1904.

Mar. 10.—Striped water snake from South America—P. C. Johnson.

April 14.—Emery stone from Smyrna, Turkey; Chrome iron ore, from Volo, Greece—Captain F. H. Letson, Liverpool.

Unleavened bread—Isaac Hoffman.

Cow moose (stuffed)—Dr. Cox.

June 9.—Cotton ball—Samuel Ball.

Two pairs ladies' pattens or sandals—Col. S. U. McCulley.

Spruce knob—Malcolm McNaughton.

Nest of young rats—Arch. Freckear.

Nov. 10.—Arrow head from earthen mound in Ohio—Adam Hayes.

Walrus jaw—H. Morrison, Church Pt.

Old sword dug up in a cellar in Chatham—Jas. McCallum.

Fossils—G. Stead.

Two water-washed stones—D. Loggie, Church Pt.

Agate from Lake Superior—R. S. Ward.

Concretion—Thos. Traer, Nappan.

Whalebone—Anthony Adams.

Sea Coot—Michael Murray.

Dec. 8.—Canary from Grand Canaries—Mrs. M. S. Benson.

Caddis worm—Thos Traer.

1904.

Jan. 12.—Black vulture—E. Allan, Escuminac.

Two specimens of concretion—Thomas Traer.

Bones, axe and iron pot handles, from Tracadie—G. Stead.

Meetings, Papers, Lectures, etc.

The regular monthly meetings were held as usual, and during the winter and spring months weekly meetings in addition, when papers were read or lectures given on various subjects.

The following is a list of these discourses:—

1903.

Feb. 24.—"The Peat Bogs of New Brunswick," Dr. Chalmers, Ottawa.

Mar. 3.—"Evaporation, Rain and Winds," Dr. Baxter.

Mar. 10.—Business Meeting.

- Mar. 17.—“Okeamo’s and Stathy’s Kingdom,” Dr. Baxter.
 Mar. 24.—“The Depths of the Ocean,” Dr. Baxter.
 Mar. 31.—“Coal and its Products,” J. D. B. F. McKenzie.
 April 7.—“Coal and its Products,” J. D. B. F. McKenzie.
 April 14.—Business Meeting.
 April 21.—“Chinese Peculiarities,” Dr. Baxter.

1904.

- Jan. 12.—“John Norton’s ’Xmas” (Reading), Dr. Baxter.
 Jan. 19.—“Unity of Nature,” Dr. Baxter.
 Jan. 26.—“Some Peculiarities of Nature’s Workings,” Dr. Baxter.
 Feb. 2.—“Electricity,” E. W. Cameron.

Office-Bearers for 1904.

Patron.—His Honour Lieut.-Governor Snowball.

President.—Daniel Ferguson, Esq.

Vice-Presidents.—J. D. B. F. McKenzie and James Nicol.

Treasurer.—George Stothart.

Corresponding Secretary—Dr. Baxter.

Secretary—G. B. Fraser.

Librarian—Miss Bessie Creighton.

Curators—Miss L. S. Smith and Miss K. I. B. McLean.

Additional Members of Council—Dr. Cox, C. J. Mersereau, J. L. Stewart.

Directors—President, Vice-Presidents, Treasurer, Secretary, with the Warden of the County.

III.—From *The Women’s Canadian Historical Society of Toronto*,
 through MISS FITZ-GIBBON.

The Women’s Canadian Historical Society have the honour to report a year of increased interest in its objects and work. The accomplishments, though small in themselves, are indicative of satisfactory progress in the endeavour to rouse interest in Canadian history and the preservation of matter for the use of future historians.

Since submitting the last report, seven regular and two special meetings have been held, at which the following papers have been read: “The Development of Canadian Literature,” by the late Mrs. Curzon, with a supplementary note by the Secretary.
 “Fiscal Reform as affecting Canada,” by Mrs. H. C. Osborne.

- "A Chapter on Acadia," by Lady Edgar.
- "Early Travellers in Upper Canada (Ontario)," by M. Agnes Fitz-Gibbon.
- "The Development of Art in Canada," 1st Part, by Mrs. Wellesley Holmsted.
- "The Quaker Settlements in Ontario," by Miss Jean Graham.
- "The Development of Art in Ontario," 2nd Part, by Mrs. Wellesley Holmsted, illustrated by a volume of original sketches by Mrs. Jameson, loaned by Mrs. Jas. Bain.
- "A Sketch of Chateau Papineau," by Miss Sara Mickle.
- "Extracts from the Diary and Impressions of a British Officer at Plattsburg" (original), loaned by Mr. S. G. Wood.

At the meeting held on September 3rd, in the Women's Building, Dominion Industrial Exhibition, the members had the honour of welcoming their new Honorary President, Mrs. Mortimer Clark. His Honour the Lieutenant-Governor was also present, and spoke in the kindest terms of the work of the Society. A graphic account of the historic points of interest in the Lower Provinces was given by Mr. Frank Yeigh.

We have also to record with gratitude to Mr. E. B. Osler, M.P., the loan of his recently purchased collection of historic portraits and paintings by the late Paul Kane, depicting Indian life and character. These belonged to the estate of the late Honourable Senator G. W. Allan, whose knowledge of their historic value had induced him to preserve them. An exhibition was held in Scott's Gallery, Toronto, for three weeks, under the auspices of this Society. It was largely attended, the interest in the pictures being increased by the ability of the Secretary to quote full descriptions of each from the artist's diary and account of his travels, now a rare book. The net proceeds were \$318, \$241 of which were added to the Memorial Hall Fund. This fund has also been further augmented during the year by the production of the early Victorian play, "Rosemary," on June 4th. For the success of this we are largely indebted to Mr. Douglas Argyle Paterson, the only professional taking part, and to the business ability and interest of Mrs. F. A. Paterson. By it \$208 were added to the fund, which now amounts to \$3,312.62.

An open meeting, for which 1,000 cards were issued, was held on February 23rd. A valuable paper on "Who was Joseph Howe?" was read by Mr. George M. Morang—Professor Mavor in the chair. A musical programme and refreshments followed.

Thirty-seven new members have been added to the roll. The Society has had to mourn the loss of two of its most valuable members.

Mrs. Williamson, who though full of work as President of the Women's Auxiliary of the Anglican Church, was able to give us her helpful interest on many occasions, passed away, leaving the record of a full day's work well done. Miss Edith Curzon, whose day of bright usefulness and influence for good, whose ability, genius and faithfully-acquired knowledge was but bearing its first fruit with a bright promise of the future, was taken from us suddenly. She was drowned when bathing in the Georgian Bay in August.

The Society acknowledges with gratitude the first recognition of its work by the Ontario Government in the grant of \$50 made for its printing expenses in October last. With it the accompanying Transaction No. 4 was printed, and has been widely distributed. A further grant of \$100 was passed at the last session, which will enable the publication of a number of original records and papers now in our hands.

A number of donations of books, papers, prints and original manuscript notes have been received, full list of which will be printed in the annual report.

Officers:

Honorary President.—Mrs. Mortimer Clark.

President.—Lady Edgar.

1st Vice-President.—Mrs. Forsyth Grant.

2nd Vice-President.—Mrs. Edward Leigh.

Treasurer.—Miss McCallum, 13 Bloor Street West.

Corresponding Secretary.—Miss Fitz-Gibbon, Hillcrest, Bracondale.

Recording Secretary.—Mrs. Seymour Corley.

IV.—From *The Natural History Society of Montreal*, through

REV. R. CAMPBELL.

The Natural History Society of Montreal has the honour to submit to the Royal Society the following report of its transactions for the year 1903-4:—

The Society has had a very successful session. The attendance at the monthly meetings, at which papers on scientific subjects were read and discussed, kept up well. The topics dealt with covered a considerable range, as the synopsis subjoined shows.

The special communications, 22nd October, 1903, were on "The Toadstools of Montreal, Edible and Poisonous," by Rev. Robert Campbell, M.A., D.D., and on "Further Observations of the Aurora Borealis," by Charles J. Stuart, Esq.

On November 26th, 1903, the communications were on "The Mollusca of Montreal," by S. Cleveland Morgan, B.A., and Dr. Robert Campbell submitted "Some Additional Notes on the Flora of Montreal, including the Toadstools."

On January 28th, 1904, there was a communication from Prof. MacBride, Sc.D., on "The Canadian Oyster," and one from Charles J. Stuart on "The Great Aurora Borealis of October 31, 1903, as seen at Montreal."

On February 25th, 1904, the communications submitted were on "The Pleistocene of Montreal and the Ottawa Valley, as seen from the Windows of a Railway Carriage," by J. S. Buchan, B.C.L., K.C., and on "Insect Miners and their Habits," illustrated by coloured lantern slides from nature, by A. E. Norris, Esq.

On March 31st, 1904, Prof. Frank Adams, Ph.D., F.R.S., made a special communication on "Mount Royal and the Monteregian Hills," and Dr. Robert Campbell one on "Some Characteristic Plants of British Columbia."

On April 21st, 1904, the special communications were on "Some Recent Developments in the Classification of the North American Coniferae," by Professor D. P. Penhallow, ScD., and on "The Fresh Water Fishes brought to Montreal Markets," by J. Stafford, M.A., Ph.D.

At the last meeting of the season, held May 26th, 1904, Prof. E. W. MacBride, MA., Sc.D., gave a special communication on "The Origin of the Human Race."

The condition of the Library and Museum remains much as it was a year ago. The lack of space for expansion in both these departments of the Society's work is greatly felt.

The Somerville Course of Lectures, which attracted unusually large audiences, embraced the following:—

Friday, Feb. 26, 1904.—"Bermuda and its Coral Reefs," by Prof. C. S. Bristol.

Thursday, Mar. 3, 1904.—"The Yukon Country," by Prof. John Macoun, M.A.

Thursday, Mar. 10, 1904.—"Canada's Great Inland Sea (Hudson's Bay), and the Surrounding Country,"
by Dr. Robert Bell, F.R.S., etc.

Thursday, Mar. 17, 1904.—"The Grand Canyon of Arizona," by H. Bragg, Esq.

Thursday, Mar. 24, 1904.—"Japan: Its Geography and People," by Shaw T. Nishimura, Esq.

Thursday, Mar. 31, 1904.—"The Sandwich Islands," by Edgar Judge, Esq.

The Half-Hour Saturday Afternoon Talks to Young People were as follows:—

Saturday, Feb. 27.—On “A Piece of Maple Sugar,” by J. S. Buchan, Esq., B.C.L., K.C.

Saturday, Mar. 5.—“Dick’s Dive in a Duck Pond,” by C. T. Williams, Esq.

Saturday, Mar. 12.—“The Story of an Apple,” by Miss Carrie M. Derick, M.A.

Saturday, Mar. 19.—“How Plants Look after their Children,” by Miss Eleanor Tatley, B.A.

Saturday, Mar. 26.—“The Purpose and Value of Pain,” by T. Wesley Mills, M.D.

Saturday, April 2.—“Wild Flowers and How to Treat Them,” by G. Colborne Heine, B.A.

Saturday, April 9.—“On Collecting, Drying and Mounting Plants,” by Robert Campbell, M.A., D.D.

These Saturday afternoon lectures were attended by crowds of children, with a few adults mingled with them.

The Annual Field Day of the Society was to Calumet, but the wetness of the day hindered its success. Those who ventured on the excursion were, however, heartily welcomed and hospitably entertained by the authorities of the district.

The Society lost by death five members during the year, amongst them Samuel Finley, Esq., and Hon. Justice Wurtele, two of its Vice-Presidents, and Major L.A.H. Latour, one of its oldest members and office-bearers. But the gains in the number added more than compensated for the losses.

The Microscopical Society has agreed to merge itself in the Natural History Society, and its co-operation is looked to to add to the success of the Natural History Society’s undertakings in future.

The following are those who at present hold office in the Society:—

Patron.—His Excellency the Governor-General of Canada.

Hon. President.—Lord Strathcona and Mount Royal.

President.—E. W. MacBride, M.A., Sc.D.

Vice-Presidents.—Frank D. Adams, Ph.D., F.R.S.C.; Rev. Robert Campbell, M.A., D.D.; B. J. Harrington, Ph.D., F.R.S.C.; Albert Holden, J. H. Joseph, Dr. Wesley Mills, Prof. D. P. Penhallow, Hon. J. K. Ward, Hon. Justice Wurtele.

Hon. Recording Secretary.—F. W. Richards.

Hon. Corresponding Secretary.—C. E. H. Phillips

Hon. Treasurer.—Chas. S. J. Phillips.

Hon. Curator.—A. E. Norris.

Members of Council.—C. T. Williams, Chairman; J. A. U. Beaudry, C.E.; J. S. Buchan, K.C., B.C.L.; Joseph Fortier, John Harper, Edgar Judge, H. McLaren, Alex. Robertson, B.A.

Superintendent.—Alfred Griffin.

The Society owes not a little for its success to the activity, courtesy and zeal of its superintendent, Mr. Alfred Griffin, and Mrs. Griffin.

V.—From *The Niagara Historical Society*, through
MISS JANET CARNOCHAN.

In respectfully placing our report before your honourable body, we are glad to be able to report considerable work done. Our membership has increased, we having now seventy members, but the larger half of these are non-resident. Monthly meetings were held from October to May, and the following papers read:—"An Historic House, the Court House and Jail, built 1818," by the President; "The Influence of the U.E. Loyalists in the Growth of our Country," by Rev. A. Sherk; "References to Niagara in Early Books of Travel," by the President. We have issued during the year another publication, No. XI., "Reminiscences of Niagara," which is meeting with much favour. We have distributed over four hundred pamphlets during the year. Considerable additions have been made to the collection in our Historical Room, and we have had many visitors. An historical item appears at intervals in our local paper.

At the annual meeting of the Ontario Historical Society at St. Thomas last year a committee was appointed, consisting of C. C. James, M.A., President of the Ontario Historical Society; David Boyle, Secretary of the same; Col. G. Cruickshank, Jas. Wilson, Superintendent Victoria Park, and Miss Carnochan, the President of the Niagara Historical Society, to memorialize the Dominion Government with regard to the condition of the historic spots here, but nothing has been heard in answer. Our Society, however, spent some of its own funds in repairing the remains of Navy Hall to prevent its collapse.

But our principal work during the year has been in the direction so much needed, of taking measures to provide better accommodation for our valuable collection, and here we feel that we have decidedly taken a step in advance. A public meeting was held on 17th September, our anniversary, in which several gentlemen from Toronto took part—C. C. James, David Boyle, Rev. A. Sherk, A. W. Wright—besides several in town—W. Kirby, the Mayor, etc. It had been determined to first petition the Government and Municipalities, but we were advised to see what we could do first ourselves, and then appeal to other

sources. In accordance with this advice, a committee was formed, a circular prepared to send to residents, former residents and others interested. Five hundred circulars have been sent out, and almost as many letters written, and as a result \$1,000 have been subscribed. An appeal was then made to the Provincial Government, and \$500 was granted. We have not yet decided whether to try to obtain enough for a separate building or use this money in fitting up the Town Hall for the purpose. Our room is now crowded with articles of historic interest, and many more have been promised should a larger and safer room be provided. We feel encouraged to continue our work, and are glad to know that more interest is being taken in the history of our country, a history second to none in interest. It is now a saying of the past, proved absolutely untrue, that "Canada has no history."

Officers:

Patron.—Wm. Kirby, F.R.S.C.

President.—Miss Carnochan.

Vice-President.—Henry Paffard.

Secretary.—Alfred Ball.

Assistant-Secretary.—John Eckersley.

Treasurer.—Mrs. S. D. Manning.

Curator and Editor.—Miss Carnochan.

Hon. Vice-Presidents.—Mrs. Roe, Mrs. H. Clement, C. F. Ball.

Committee.—Rev. J. C. Garrett, Mrs. T. F. Best, W. J. McClelland, R. E. Denison, W. Miller.

VI.—From *The Ottawa Field-Naturalists' Club*, through
DR. JAMES FLETCHER.

The Ottawa Field-Naturalists' Club has now completed its twenty-fifth year. The completion of a quarter of a century of active, organized work was fittingly celebrated by the members of the club. The first of the winter soirées was addressed by speakers who were all members of the first Council, and each told briefly of some of the many changes of the past twenty-five years, and the part the club has taken in leading and directing scientific thought during that time. That the work of the club is a permanent one, and that it possesses more than ordinary interest, is shown by the fact that of the members of the first Council now resident in Ottawa all are still actively connected with the club.

During the year special efforts have been put forth towards enlisting the teachers and students of the various educational institutions in the work of the club. This has been done by means of numerous field excursions, lectures and demonstrations, and the addition of a Nature Study Department to the "Ottawa Naturalist." The result has been to diffuse the work into new channels. A number of the teachers of the city have taken their classes afield for an afternoon's study of the birds, flowers, trees, rocks, soil, etc., of some locality.

Membership.

Twenty-one ordinary members and one honorary member have been added to the club during the year.

The total membership is now 266, composed of 258 ordinary members and eight corresponding. The aim of the club is to increase the number of working members, and every effort is made to induce the public to attend the soirées and excursions, so as to actually see the interesting nature of the work.

Winter Soirées.

Fortnightly meetings were held throughout the winter, and were largely attended both by members and the general public. The demonstration meeting proved to be so popular that it is proposed to conduct a series of such during the next winter, with the object of preparing the newer members for intelligent field work.

Following is the programme of the past year:—

1903.

Dec. 15.—Twenty-Fifth Anniversary of the Founding of the Club.

Address of Welcome, by Principal J. F. White, of the Normal School.

The President's Address.

"The Study of Natural History at Ottawa before the Formation of the Club." Lieut.-Col. W. White, C.M.G.

"Botanical Conditions Round Ottawa twenty-five years ago." R. B. Whyte.

"Ottawa as a Natural History Locality twenty-five years ago." Dr. James Fletcher.

"The Workers in Natural History at Ottawa twenty-five years ago." Lieut.-Col. W. P. Anderson.

"What the Ottawa Field-Naturalists' Club has accomplished." Dr. H. B. Small.

1904.

Jan. 5.—“The Differences and Correspondences between the Avifauna of Ottawa and of the Maryland Alleghenies.”
Rev. G. Eifrig.

Report of the Geological Branch.

Jan. 19.—“The Recent Landslide on the Lièvre River,” illustrated
by slides. Dr. A. E. Barlow.

Report of the Ornithological Branch.

Feb. 2.—“Sap and Sap Circulation.” F. T. Shutt, M.A.

“Two Springs.” Dr. C. Guillet.

Feb. 16.—“A Summer’s Cruise on the Labrador Coast,” illustrated by
lantern slides. Dr. R. A. Daly.

Mar. 1.—“Colour in Nature.” Dr. S. B. Sinclair.

Report of the Entomological Branch.

Mar. 15.—Annual Meeting.

Report of the Zoological Branch.

Report of the Botanical Branch.

April 5.—Short Talks on how to Collect and Preserve Specimens, with
Practical Demonstrations by various members of the
club.

Excursions.

Nine sub-excursions were held during the season of 1903. The attendance varied from twenty to two hundred. Special attention was given to the forest trees, their mode of growth and the various means of identifying them. The two general excursions were to outlying localities, and were still more largely attended. Much individual work was also done by different members of the club.

Work Done by the Several Branches.

The work of the branches covers a wide field. The Botanical section was exceptionally fortunate in having several of the leaders in Ottawa during the entire season. Prof. J. Macoun, in his official capacity, spent the summer in Ottawa and vicinity, making a special study of the fungi. He added over two hundred species to the Ottawa flora. Dr. James Fletcher has continued his studies of violets, and done much toward the differentiation of species. Dr. Guillet has devoted much time to phenological observations, and Mr. D. A. Campbell to the morphology of plants. During the winter several meetings were held at the homes of the members. At each meeting a paper was read and discussed.

The Entomological Branch also held house to house meetings fortnightly, and several interesting papers were read. The exhibition of specimens at these meetings has led to renewed activity in collecting and studying the insects of the district, and large additions have been made to the local lists.

The Geological Branch report no systematic work done in the vicinity of Ottawa. Leaders, however, attended the excursions, and a larger number than usual joined the Geological Section on these occasions.

The Ornithological Branch also had leaders at the different excursions to aid in the identification of birds seen and heard. Through the aid of the Hon. Frank Latchford, arrangements have been made for the appointment of a special officer to enforce the Provincial Act that prohibits the destruction or trapping of useful birds.

The Ottawa Naturalist.

The "Ottawa Naturalist," the official organ of the club, was published regularly during the past year under the editorship of Mr. James M. Macoun. Twelve numbers, containing 228 pages with 8 plates, were issued. An article on "Nature Study" appeared in each issue. A large number of copies of each article was printed and distributed to teachers throughout the Dominion. This department has proved so profitable that it is to be continued under the direction of Dr. Fletcher.

Officers of the Club.

At the annual meeting held in March, 1904, the following officers were elected for 1904-05:—

Patron.—The Right Honourable Earl of Minto, Governor-General of Canada.

President.—W. T. Macoun.

Vice-Presidents.—S. B. Sinclair, B.A., Ph.D.; W. J. Wilson, Ph.B.

Librarian.—J. H. Putnam, B.A.

Secretary.—T. E. Clarke, 470 O'Connor Street.

Treasurer.—Arthur Gibson, Central Experimental Farm.

Committee.—Dr. Jas. Fletcher, Rev. G. Eifrig, Mr. J. M. Macoun, Miss M. McK. Scott, Miss A. Matthews, Miss R. B. McQuesten.

Auditors.—J. Ballantyne and R. B. Whyte.

Standing Committees of Council.—Publishing: J. Fletcher, Miss M. McKay Scott, W. J. Wilson, Arthur Gibson, G. Eifrig, J. M. Macoun.

Excursions: S. B. Sinclair, J. Fletcher, T. E. Clarke, A. Gibson, Miss Ruby B. McQuesten, Miss Annie L. Matthews, Miss M. McKay Scott.

Soirées: W. J. Wilson, J. H. Putnam, J. M. Macoun, T. E. Clarke, G. Eifrig, Miss Ruby B. McQuesten, Miss Annie L. Matthews.

Leaders.—Geology: H. M. Ami, W. J. Wilson, D. B. Dowling.

Botany: J. M. Macoun, C. Guillet, D. A. Campbell, A. E. Attwood, S. B. Sinclair, T. E. Clarke.

Entomology: J. Fletcher, W. H. Harrington, C. H. Young, A. Gibson.

Conchology: J. F. Whiteaves, F. R. Latchford, J. Fletcher, S. E. O'Brien.

Ornithology: John Macoun, A. G. Kingston, G. Eifrig, E. F. G. White.

Zoology: E. E. Prince, Andrew Halkett, W. S. Odell.

Archæology: T. W. E. Sowter, J. Ballantyne.

The Ottawa Naturalist.

Editor—James M. Macoun.

Associate Editors:

Dr. R. W. Ells, Geological Survey of Canada—Department of Geology.

Dr. J. F. Whiteaves, Geological Survey of Canada—Department of Palæontology.

Dr. A. E. Barlow, Geological Survey of Canada—Dept. of Petrography.

Dr. Jas. Fletcher, Central Experimental Farm—Botany and Nature Study.

Hon. F. R. Latchford—Department of Conchology.

Mr. W. H. Harrington, Post Office Department—Dept. of Entomology.

Rev. G. Eifrig, 210 Wilbrod Street—Dept. of Ornithology.

Prof. E. E. Prince, Commissioner of Fisheries for Canada—Department of Zoology.

VII.—From *The Women's Canadian Historical Society of Ottawa*,
through Mrs. S. E. DAWSON.

During the year terminating March 28th, 1904, the Women's Canadian Historical Society of Ottawa held seven regular and one special meeting. The general meetings numbered seven and one open meeting; this latter, addressed by Mr. C. C. James, of Toronto, was very largely attended, and was honoured by the presence of the Rev. Dr. Herridge, who occupied the chair. At the December general meeting, the ordinary routine of our assemblies was departed from, and

an interesting programme was arranged for the senior children of the city schools, who responded in large numbers to the invitation to attend.

Lectures were delivered before the Society by Sir Louis Davies and Colonel Coutlee.

To our list of honorary members we have this year added the names of Rev. Dr. Herridge, Mr. C. C. James, Toronto; Col. Coutlee, Sir Louis Davies, and Mr. Chas. Mareil, M.P.

The additions to our library have consisted of volumes of transactions and reports from the Niagara Historical Society, a pamphlet from the United Empire Loyalists' Association, Transactions from the Manitoba Historical and Scientific Society.

From Sir James Lemoine, a copy of his work, "Picturesque Quebec."

From Mrs. Carr-Harris, a copy of her book, "The White Chief of the Ottawa Valley," and two diaries from our own members, Mrs. S. E. Dawson, and Mrs. Kerwan.

A volume of transactions from the State Historical Society of Wisconsin, and the "Iowa Journal of History and Politics. Pamphlets were received from the Swedish Historical Society and a catalogue in French of the Stockholm Museum of Antiquities.

The membership now numbers 148. The income for the year was \$115.19, and our expenditure \$97.58, as presented by the Treasurer, Mrs. Harold Pinhey.

Our three scrap-book committees accomplish a great deal of useful work, and the general interest manifested by our members constitutes a hopeful look-out for the coming year.

Officers:

Patron—Her Excellency the Countess of Minto.

Hon. President—Lady Laurier.

President—Mrs. Thos. Ahearn.

Recording Secretary—Miss May E. O'Connor.

Treasurer—Mrs. Harold Pinhey.

Librarian—Miss M. A. Northwood, B.A., 330 Chapel Street.

Corresponding Secretary—Miss McDougal, Hintonburgh.

VIII.—From *The Natural History Society of New Brunswick*, through HON. J. V. ELLIS.

I have the honour to present the report of the Natural History Society of New Brunswick, which, I am pleased to say, is making continual progress in studying and making known the natural history of this province.

A band of active original workers are connected with this Association, and continue to give it the result of their investigations. These are preserved and published in the Annual Bulletin of the Society, which has now reached its 22nd number, and of which a copy is presented with this report.

In this number Prof. L. W. Bailey tells what is known of New Brunswick Caves, and gives some interesting examples of rock-sculpture and erosion on the sea-coast of New Brunswick.

Prof. W. F. Ganong is an indefatigable explorer of the wilds of New Brunswick, and has given a continuation of his voluminous notes on the Physiography of New Brunswick. Besides his work among the northern hills, he, in company with Dr. G. U. Hay, explored Oro-mocto Lake.

Mr. S. W. Kain contributes a note on "Recent Earthquakes in New Brunswick," and Dr. Matthew one on the genus *Hylopus* of Dawson.

The latter also has an article on the "Physical Aspect of the Cambrian Rocks in Eastern Canada," with a list of organic remains.

Following these are "Observations of Plants"—a record of the time of flowering of plants at Ingleside, near St. John, and other botanical data, contributed by Dr. Hay.

Lectures.

Ten regular meetings, including the annual meeting, were held, and two special meetings. The following are the dates of the meetings and the titles of papers read:—

1903.

Jan. 6.—(a) On the reported appearance of the Panther (*Felis concolor*) in New Brunswick, by Prof. W. F. Ganong.

(b) The Parasite, by Geo. G. Melvin, M.D.

(c) Some Rare Plants and their Habits, by H. F. Perkins, Ph.B.

Jan. 20.—Annual Meeting. President's Address. Election of Officers.

Feb. 3.—(a) Notes on the Natural History and Physiography of N.B., by Prof. W. F. Ganong.

(b) Notes on New Brunswick Fishes, by Chas. F. B. Rowe.

Mar. 3.—(a) The Forestry Situation in New Brunswick, by Prof. W. F. Ganong.

(b) Notes on the Violets; "Wintering"; by J. Vroom.

April 7.—(a) The Structure of the Common House Fly, by W. H. Mowatt.

(b) Some remarkable Tree Forms in New Brunswick, by W. F. Ganong.

- May 5.—(a) Birds and their Structure, by A. Gordon Leavitt.
 (b) Birds and their Nests, by J. W. Banks.
- June 2.—Report of the Royal Society Meeting at Ottawa, by Dr. G. F. Matthew.
- Oct. 6.—(a) Notes on New Brunswick Mushrooms, by G. U. Hay, D.Sc.
 (b) The Highest Land in New Brunswick, by W. F. Ganong, Ph.D.
- Nov. 3.—(1) Fossil Foot Prints; (2) Genus *Hylopus*—Dawson; by G. F. Matthew, D.Sc.
 Two papers on the Physiography and Natural History of New Brunswick (read by title), W. F. Ganong.
- Dec. 1.—Caverns, Caves and Cavities, by Professor L. W. Bailey, Ph.D.
 Papers by Dr. Ganong (read by title).

December 30, a special meeting was called, which was addressed by Mr. M. L. Fernald on the distribution of certain plants on the Gulf of St. Lawrence shores.

A special meeting was also held on the evening of February 10th to hear the address of Hon. H. A. McKeown on "The Border Land between Insanity and Crime."

An elementary course of lectures was given on the Tuesday evenings not occupied by the regular meetings during the months of January, February, and a part of March. The following programme was carried out:—Dr. G. F. Matthew gave two lectures: January 13, "Volcanoes, their Origin and Effects." January 27, "Water as an Agent in Modifying the Earth's Surface."

Dr. G. U. Hay gave two lectures on Ferns, their mode of growth, reproduction, habits and uses—February 17 and 24.

Mr. A. Gordon Leavitt gave one of the course of elementary lectures on Bird Structure, and another was given on Exotic Ferns by Mr. Wm. McIntosh.

Ladies' Association.

The following course of lectures, carried out on Thursday afternoons during the winter by the Ladies' Association, was in marked agreement with the objects of our Society:—

- Jan. 15.—Thoreau, Mrs. E. S. Fiske.
 22.—Reminiscences of the American Museum, Mrs. G. F. Matthew.
 29.—Children's Day—A Talk on Insects, Mr. Wm. McIntosh.
- Feb. 5.—Wordsworth: A Nature Poet, Mrs. G. A. Hamilton.
 12.—Colour in Nature, Miss A. Jack.

- Feb. 19.—A Prehistoric Mound in Ontario, Miss A. L. Hunt.
 26.—Children's Day—A Talk on Birds, Mr. A. Gordon Leavitt.
 Mar. 5.—The Scientific Basis of Art (illustrated), Miss M. Barry Smith.
 12.—A Ramble in Switzerland, Miss Christine Matthew.
 19.—Nature Study in the Public Schools, Miss G. Murphy.
 26.—Reunion of Members.

There are eighty-four names on our associate membership roll, a slight increase over the previous year. The organization continues to be a very active one, and the ladies have shown themselves at all times desirous to assist heartily in the work and objects of our Society.

Some important additions have been made to the Museum during the past year, including objects of the French period and a collection of insects, the latter from Mr. Wm. McIntosh. The former are of special interest at the present time, when we are celebrating the Ter-centenary of Champlain.

The field work of the Society during the past season was confined to a series of Saturday excursions for the purpose of studying the plants and animals of Rockwood Park and other places in the vicinity of the city of St. John.

It is a great gratification to the members of this Society that the Royal Society of Canada responded so readily to the invitation of this Society and two other kindred organizations to hold its annual meeting for 1904 in this city on an anniversary which must be for ever memorable—that of the discovery of the river St. John by Champlain. It is the desire of these societies to do everything in their power to make the visit of the Royal Society of Canada profitable and agreeable.

The following shows the numbers, classes and total enrolled membership:—

Honorary	4
Life	5
Corresponding	24
Ordinary	54
Associate	81
Junior	2
<hr/>	
Total	173

The following are the office-bearers and committees chosen by the Society for the current year:—

Patron—His Honour the Lieutenant-Governor, Honourable J. B. Snowball.

Council for 1904.

President—Hon. J. V. Ellis, LL.D.
 Vice-Presidents—G. F. Matthew and G. U. Hay.
 Treasurer—A. G. Leavitt.
 Secretary—W. L. McDiarmid.
 Librarian—W. L. Ellis.
 Curators—S. W. Kain, Wm. McIntosh, J. W. Banks.
 Additional Members—H. G. Addy, M.D., J. Roy Campbell, James A. Estey.

Associate Members' Branch.

President—Mrs. G. F. Matthew.
 Vice-Presidents—Mrs. G. U. Hay and Mrs. H. G. Addy.
 Secretary-Treasurer—Miss Edith McBeath.

Standing Committees.

Archæology—S. W. Kain, Dr. A. C. Smith, Miss Jack.
 Botany—G. U. Hay, Prof. W. F. Ganong, John Brittain, James Vroom.
 Entomology—Wm. McIntosh, A. G. Leavitt.
 Finance—A. G. Leavitt, J. Roy Campbell, W. F. Hatheway.
 Geology—Dr. G. F. Matthew, Prof. L. W. Bailey.
 Lectures—Dr. G. U. Hay, Dr. H. G. Addy, Dr. G. F. Matthew.
 Library—Dr. G. U. Hay, Wm. McIntosh, Dr. W. L. Ellis, Mrs. G. U. Hay, Mrs. W. F. Hatheway, Miss McBeath.
 Microscopes—Dr. W. L. Ellis, Dr. G. G. Melvin, W. H. Mowatt.
 Ornithology—A. G. Leavitt, Wm. White, J. W. Banks, Mrs. G. U. Hay.
 Press—Dr. G. U. Hay, A. G. Leavitt, Wm. McIntosh, W. L. McDiarmid.
 Publications—Dr. G. F. Matthew, S. W. Kain, G. U. Hay, A. G. Leavitt, W. L. McDiarmid.
 Rooms—Dr. H. G. Addy, Mrs. G. F. Matthew, Mrs. G. U. Hay.

IX.—From *The Entomological Society of Ontario*, through the REV. C. J. S. BETHUNE, D.C.L., read by DR. JAMES FLETCHER.

The Entomological Society of Ontario has now continued in active operation for two score years, and held its *fortieth* annual meeting in Ottawa on the 3rd and 4th of September last. Of the little band of

enthusiasts who met in Toronto in April, 1863, for the purpose of organizing the Society, but three now survive, Dr. Wm. Saunders, Rev. Dr. Bethune and Mr. E. Baynes Reed; it is gratifying to note that they have continued to take an active interest in the welfare of the Society from that time to the present.

"The Canadian Entomologist," the monthly magazine of the Society, is now in its 36th year of publication. The volume for 1903 contains 352 pages, and is illustrated with six full-page plates and fifteen figures in the text, all from original drawings. The contributors number sixty-one, and represent Canada, the United States, Great Britain, Germany, Luxemburg and Cuba. The principal articles may be grouped as follows:—Descriptions of new genera, species and varieties of Lepidoptera by Prof. J. B. Smith, Dr. H. G. Dyar and Mr. G. M. Dodge; in Hymenoptera by Dr. W. H. Ashmead, Profs. T. D. A. Cockerell and H. T. Fernald, Messrs. J. C. Bradley, A. W. Morrill, J. C. Crawford, R. A. Cooley, C. Robertson, Rev. T. W. Fyles and Dr. S. Graenicher; in Diptera by Messrs. D. W. Coquillett, F. V. Theobald, and J. S. Hine; in Coleoptera by Prof. H. F. Wickham and Mr. C. Schaeffer; in Hemiptera-Homoptera by Prof. Cockerell, Messrs. A. W. Morrill, R. A. Cooley, A. L. Quaintance, G. B. King, E. B. Ball and W. T. Clarke; in Hemiptera-Heteroptera by Mr. C. Stevenson; and in Orthoptera by Messrs. E. M. Walker and E. S. G. Titus. Thirty-nine new genera are described, 106 new species and 8 new varieties and sub-species.

Life-histories, more or less complete, are given of the following insects: *Crocigrapha Normani* and several Canadian species of *Apanthesis* by Mr. Arthur Gibson; the strawberry Aleyrodes (*A. Packardi*) by Mr. A. W. Morrill; *Hydroecia appassionata* found boring in *Sarracenia* by Mr. H. Bird; the Apple Bud-borer (*Stelganoptycha pyricolana*) by Prof. E. D. Sanderson; *Mamestra laudabilis* by Dr. H. G. Dyar; and several species of Mosquitoes by Mr. F. V. Theobald.

Papers on Classification, Nomenclature and Systematic Entomology; the Wasps of the super-family Vespoidea by Dr. Ashmead; Arctic Hymenoptera by Mr. W. H. Harrington; Nomadinae and Epeolinae by Mr. C. Robertson; Prof. Aldrich and Mr. Coquillett on *Culex*; Mr. J. C. Bradley on the genus *Platylabus*; Mr. E. M. Walker on the genus *Podisma* in Eastern North America; Dr. Dyar and Mr. A. Bacot on *Aglia tau*; Mrs. Fernald on Coccidae; Dr. Fletcher and Prof. Grote on Lepidoptera; Prof. Cockerell and Mr. Titus on Hymenoptera.

Collecting notes, and papers on the geographical distribution of species, are given by Prof. A. D. Hopkins on Forest Insect Explorations; Mr. Coquillett on the Phorid genus *Ænigmatias* in Denmark and

Arizona; Mr. G. B. King on Records of Coccidae; Dr. Fyles on Quebec Diptera; Mr. J. D. Evans on the Coleoptera of North Western Canada; Mr. W. T. Clarke on Californian Aphididae; Butterfly notes from Toronto by Mr. J. B. Williams; Collecting in February by Mr. J. R. de la Torre Bueno; the capture of *Egialites debilis* in British Columbia by the Rev. J. H. Keen.

Among the miscellaneous papers may be mentioned a house-boat collecting trip in China by Mr. C. L. Marlatt; a Coleopterous Conundrum by Mrs. A. T. Slosson; a Migration of Butterflies in Venezuela by Mr. A. H. Clark; the habits of *Ranatra fusca* by Mr. Bueno; the Spinning methods of Polyphemus by Mr. J. W. Cockle; papers on Coleoptera by Prof. Wickham, on Bees by Prof. Cockerell, and Entomological notes by Mr. H. H. Lyman. There are also several reviews of new books by the Editor and others.

The thirty-fourth annual report of the Society was published by the Ontario Department of Agriculture in March last. Its distribution has unfortunately been very limited owing to the destruction of 5,000 copies by the disastrous fire in Toronto on the 19th of April. The volume consists of 116 pages, illustrated with a portrait of the Rev. G. W. Taylor, four halftone plates of orchards affected by the San José scale, and sixty figures in the text; all of the blocks of these illustrations have also been lost in the fire.

The volume contains satisfactory reports from the officers of the Society, the Sections in Botany, Microscopy and Ornithology, the Branches at Montreal, Quebec and Toronto, and from the directors, Messrs. Young, Grant and Balkwill, on Insects of the year. Further notes on the season of 1903 are given by Messrs. Stevenson and Kilman, and extended reports by Dr. Fletcher and Prof. Loehhead. The latter, in his annual address as President, gave an interesting account of "The Progress of Economic Entomology in Ontario," and furnished further papers on "The Present Condition of the San José Scale in Ontario," and "A Key to the Insects affecting Small Fruits." Dr. Fletcher contributed his very valuable "Entomological Record for 1903"; Mr. Arthur Gibson papers on "The Insects affecting Basswood," and "An Interesting Enemy of the Iris"; Dr. Bethune on "A Menace to the Shade-trees of London, Ontario," "The Great Leopard Moth," and a memoir of the late Professor Grote; Dr. Fyles on "The Food-habits of Hymenopterous larvæ"; Mr. Jarvis on "Fly-tormentors of New Ontario" and a list of injurious insects taken in the Abitibi Region; Mr. A. J. Dennis on a remarkable experience in collecting moths at night in Manitoba. Dr. S. H. Scudder gives an interesting account of his "Hunting for Fossil Insects" in Wyoming and Colorado; and the

late Mr. Moffat furnished a paper on his "Recollections of the Past." Dr. L. O. Howard, United States Entomologist, was a welcome visitor at the annual meeting, and gave two most interesting addresses, of which abstracts are given in the Report, on "The Transmission of Yellow Fever by Mosquitoes," and the warfare that is being waged against the Cotton Boll Weevil in Texas.

It is with profound regret that we place on record the death of Mr. John Alston Moffat, which took place in London on the 26th of February. For fourteen years he had been the efficient Librarian and Curator of the Society and had endeared himself to all who frequented the rooms by his uniform kindness and courtesy.

The following report, showing the good work done, has been received from Mr. R. V. Harvey, Hon. Secretary of the British Columbia Entomological Society.

The *British Columbia Entomological Society* was formed in January, 1902, and its members have increased from 12 to 20 since that date. The province offers a wide and varied field for collectors, owing not only to its extent, but also to the differences of climate found between the coast and interior districts.

The remoteness of some of the towns, however, is a drawback, preventing members from meeting as frequently as they could wish. In spite of this, a great deal of work has been done. In Lepidoptera 850 species have been listed, the bulk coming from Kootenay. Of these the Noctuidæ are well represented by 350 species.

The President (Rev. G. W. Taylor) is already well known throughout Canada for his excellent work in the Geometridæ. He has also in conjunction with Mr. A. W. Hanham, done good work among the Coleoptera, and the British Columbia list now numbers some 500-600 species. The Carabidæ, Elateridæ and Cerambycidæ are very well represented.

In other orders a beginning has been made; of Diptera and Hymenoptera about 200 species each have been identified.

Our thanks are due to the experts in the various orders through whose unfailing courtesy we have been able to get our specimens determined.

The following is a list of the officers elected for the year 1903-4:
President—Professor William Lochhead, B.A., M.S., Ontario Agricultural College, Guelph.

Vice-President—J. D. Evans, C.E., Trenton.

Secretary—W. E. Saunders, London.

Treasurer—J. A. Balkwill, London.

Directors—Division No. 1.—C. H. Young, Hurdman's Bridge.
 Division No. 2.—C. E. Grant, Orillia.
 Division No. 3.—J. B. Williams, Toronto.
 Division No. 4.—G. E. Fisher, Freeman.
 Division No. 5.—R. W. Rennie, London.

Directors *Ex-officio* (Ex-Presidents of the Society)—Professor William Saunders, LL.D., F.L.S., F.R.S.C., Director of the Experimental Farms, Ottawa; Rev. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., London; James Fletcher, LL.D., F.L.S., F.R.S.C., Entomologist and Botanist of the Experimental Farms, Ottawa; W. H. Harrington, F.R.S.C., Ottawa; John Dearness, B.A., Vice-Principal Normal School, London; Henry H. Lyman, M.A., F.R.G.S., F.E.S., Montreal; Rev. T. W. Fyles, D.C.L., F.L.S., South Quebec.

Librarian and Curator—J. Alston Moffat, London.

Auditors—W. H. Hamilton and S. B. McCready, London.

Editor of the Canadian Entomologist—Rev. Dr. Bethune, London.

Editing Committee—Dr. J. Fletcher, Ottawa; H. H. Lyman, Montreal; J. D. Evans, Trenton; W. H. Harrington, Ottawa; Professor Lochhead, Guelph.

Delegate to the Royal Society—Rev. Dr. Bethune, London.

Delegates to the Western Fair—J. A. Balkwill and W. E. Saunders, London.

Finance Committee—Dr. Bethune, J. Dearness and the Treasurer.

Committee on Field Days—The Chairmen of the Sections, and Dr. Woolverton, Messrs. Balkwill, Bowman, Law, Moffat, Rennie and Saunders, London.

Library and Rooms Committee—Messrs. Balkwill, Bethune, Bowman, Dearness, Moffat and Saunders, London.

X.—From *The Nova Scotian Institute of Science*,
 through DR. HENRY S. POOLE.

The Nova Scotian Institute of Science, through its delegate, begs to submit to the Royal Society of Canada a report on its proceedings during the past session.

Meetings were held from November, 1903, to May, 1904.

The following officers were elected for the year 1903-4:—

President—Henry S. Poole, Esq., D.Sc., F.G.S., F.R.S.C., *ex-officio* F.R.M.S.

1st Vice-President—F. W. W. Doane, Esq., C.E.

2nd Vice-President—Professor E. Mackay, Ph.D.

Treasurer—William McKerron, Esq.

Corresponding Secretary—A. H. MacKay, Esq., LL.D., F.R.S.C.
Recording Secretary—Harry Piers, Esq.

Other members of Council—Maynard Bowman, Esq., B.A.; Watson L. Bishop, Esq.; Martin Murphy, Esq., D.Sc., I.S.O.; Professor S. M. Dixon, B.A., B.A.I.; Edwin Gilpin, Jr., Esq., LL.D., F.R.S.C., I.S.O.; Alexander McKay, Esq.; Professor J. E. Woodman, D.Sc.

The King's County Branch of the Institute, Wolfville, N.S., elected officers as follows:—

President—Professor Ernest Haycock, M.A.

Vice-President—Professor F. R. Haley, M.A.

Secretary-Treasurer—Professor E. W. Sawyer, B.A.

Volume XI, part 1, is in press, and will be issued shortly, whereupon part 2, containing the papers presented at the past session, will be sent immediately to press.

The following papers were communicated to the Institute during the session:—

1.—“On the Age of the Conglomerate capping the Cambrian Rocks of Nova Scotia,” by Henry S. Poole, Esq., D.Sc., F.G.S., F.R.S.C.

2.—“On Evidence of Subsidence at Louisbourg, C.B.,” by Kenneth McIntosh, Esq., C.E.

3.—“The Creation and Development of the Inorganic Foundation of the Earth,” by T. Vardy Hill, Esq.

4.—“Local Variations of Blue-eyed Grass,” by J. H. Barbour, Esq., M.B., Lieut. Royal Army Medical Corps.

5.—“Drainage Development of Rivers,” by Professor J. E. Woodman, D.Sc.

6.—“Forestry,” by E. Stewart, Esq., Dominion Superintendent of Forestry.

7.—“Forestry,” by R. H. Campbell, Esq., Assistant-Secretary of the Forestry Association.

8.—“Birds and the Selection of their Nests,” by Frank H. Reid, Esq.

9.—“The Importance of a Knowledge of Rock Foldings to Miners,” by Henry Y. Hind, Esq., D.C.L.

10.—“The Faults of Battery Point, Sydney, C.B.,” by T. Truman Fulton, Esq., B.A.

11.—“The Structure and Succession at North Sydney, C.B.,” by Loran A. DeWolfe, M.A.

12.—“The Sunken Land of Bus (long. 35 West, lat. 53 North),” by H. S. Poole, Esq., D.Sc., F.G.S., F.R.S.C.

13.—“Notes on Hydraulic Lime and Cement,” by Francis H. Mason, Esq., F.C.S.

14.—“Contribution to the Study of Solutions of Hydroxylamine and its Salts,” by W. H. Ross, Esq., B.Sc.

15.—“Structure of the Meguma (Gold-bearing) series, with reference to the Theory of Cross-folds,” by Professor J. E. Woodman, D.Sc.

16.—“The Earthquakes of March, 1904, in the Maritime Provinces,” by Professor J. E. Woodman, D.Sc.

17.—“Phenological Observations in Nova Scotia and Canada, 1903,” by A. H. MacKay, Esq., LL.D., F.R.S.C.

18.—“Bibliography of the Meguma (Gold-bearing) Series of Nova Scotia,” by Professor J. E. Woodman, D.Sc.

The following papers, etc., were communicated to the King's County Branch:—

1.—“Constitution of Matter.” (General Discussion.)

2.—“The Atomic Theory of Dalton,” by Professor E. Haycock, M.A.

3.—“The Divisibility of the Atom,” by Professor F. R. Haley, M.A.

4.—“Influence of Climate on Fruits,” by R. W. Starr, Esq.

5.—“The Black Knot of the Plum,” by Professor F. C. Sears.

XI.—From *The New Brunswick Historical Society*, through
MR. CLARENCE WARD.

At a meeting of the New Brunswick Historical Society, held on the 25th November, 1902, the Rev. William O. Raymond stated that the 300th anniversary of the discovery of the St. John river by Samuel de Champlain would occur in 1904, and suggested that a committee be appointed to make arrangements with regard to a celebration of the event.

The matter was earnestly entertained by the Society, and other public bodies became interested.

The satisfactory result of their efforts to appropriately honour the occasion is shown in the meeting of the Royal Society of Canada in St. John, and by the various other ceremonies in commemoration of this momentous epoch in the history of our country.

Since the last report of the N.B. Historical Society, two valuable and interesting contributions to the history of the province of New Brunswick have been issued by them.

The most important was the “Winslow Papers,” consisting of the letters and correspondence of the Hon. Edward Winslow, Judge of the Supreme Court of the province of New Brunswick.

Judge Winslow was Muster Master-General of the Provincial troops taken into His Majesty's pay during the American Revolutionary War.

For these papers the Society is largely indebted to the generosity of Mr. Frank Winslow, a grandson of Judge Winslow, who placed the letters and writings of his grandfather at the disposal of the Society, and also financially aided in their publication, and also to the indefatigable industry and historical research of the Rev. W. O. Raymond, a former President of the Society, in editing this large collection, with most copious explanatory notes of the many persons and events alluded to in the correspondence.

These papers will be found to shed much light upon the attitude of the Loyalists in the American Revolution, and the circumstances that attended their settlement in the Maritime Provinces at the close of the war.

They also contain a veritable mine of information with regard to the circumstance under which the province of New Brunswick sprung into existence, and much light is thrown upon the somewhat obscure period, dating from the beginning of the last century down to the close of the war of 1812.

The other publication was Bulletin No. 5 of the Collections of the Society, containing Winslow's sketch of Nova Scotia in 1783, with an introduction by W. O. Raymond, LL.D.; Monkton's Expedition on the Saint John in 1758, and John Mitchell's Diary and Field Book Survey of the Passamaquoddy in 1764, edited by W. F. Ganong, Ph.D.; Loyalists in Arms, by Dr. Raymond; Tabulated Returns of Loyalist Corps; Roll of Officers of Loyalist Corps, and Loyalist Transport Ships in 1783.

The meetings of the Society have been held with regularity, and various papers of historical interest, chiefly relating to matters in New Brunswick, prepared by the members, have been read at them.

In the centre of the city of Saint John is a burial-ground, in which rest the bodies of many of the Loyalist founders of the city. The Society has interested His Worship the Mayor and members of the Common Council in having a better care taken of the grounds and of the few tombstones remaining that mark their resting place.

The following is a list of the papers read before the Society in the year past:—

“Cobbett's Life in New Brunswick,” by S. D. Scott; “The First Common Council of the City of Saint John,” by Clarence Ward; “Historical Notes on Old City Landmarks,” by Rev. W. O. Raymond; “Insane Asylums,” with an account of the Provincial Lunatic Asylum at St. John, by Rev. C. T. Phillips; “Sketch of the Life of Samuel de Champlain,” with interesting details of his career, by Rev. W. O. Raymond.

The time occupied with preparations for the Champlain ter-centenary somewhat interfered with the usual historical course of the Society.

XII.—From the *Cercle littéraire et musical de Montréal*, through
DR. H. M. AMI.

Pas plus que les peuples heureux, notre cercle n'a d'histoire.

Nous essayons depuis 24 ans d'unir l'utile à l'agréable, *utile dulci*. Les dissertations graves alternent avec les essais humoristiques, la prose avec les vers, la musique vocale avec la musique instrumentale, et les conversations avec la visite au buffet.

Les onze séances de l'année ont été remplies par onze travaux de fond et onze sujets de discussion, parmi lesquels nous indiquerons les suivants, par ordre de date :

De l'harmonie du vers français, par M. Coussirat.

Tartuffe à Québec, par M. Sauvalle;

L'Education des jeunes filles au XVIII^e siècle, par Madame Sauvalle;

Excursion dans les Alpes, par M. Emmanuel Sandreuter;

Néologismes, par MM. Morin et Walter;

A travers l'Atlantique, par M. R. C. Smith;

La Terre Vue de la Lune, par M. Théodore Lafleur;

Le patriotisme, par Madame King et M. Caldwell;

Impressions d'Art, par M. Edouard Sandreuter;

Le caractère français, par Madame John Herdt et M. Duclos;

Port-Royal, par Madame R. C. Smith;

Lamartine, par Mesdames Cornu et Laberge;

Amitiés de femmes, par Mesdames Lomer et Cornu.

Valons-nous mieux que nos ancêtres?, par Melle Eglauch et M. Em. Sandreuter;

De l'accent personnel, par M. Coussirat.

Une soirée de gala a été donnée en l'honneur de Melle Viauzone.

Les réunions continuent à se tenir dans les maisons particulières. Si le nombre des membres est par cela même restreint, leur assiduité est plus grande et leur intérêt plus soutenu.

XIII.—From *The Historical and Scientific Society of Manitoba*, through
HON. DAVID LAIRD.

The Society has had a prosperous year. The connection between the city and the Society is still maintained, and is of advantage to both.

The city of Winnipeg has in erection the Carnegie Library building, which will be finished during the present year. It is expected that the Historical Society will find quarters in the new building, and thus be able to utilize its museum articles, which are now stored in different

places, and also make full use of the fine Reference Library of from 8,000 to 10,000 volumes and pamphlets.

During the past year a Natural History Society has been organized in Winnipeg, and the annual meeting of the Historical Society had with it the young Natural History Society. As the Historical Society has a comfortable sum on hand for the purchase of books and other purposes of the Society, and has few expenses, it may be expected that the young Society, at present without resources, may become one of the sections of the older Society, having one branch for history and the other for science. The Provincial Government and the city of Winnipeg both continue their grants.

Several important papers were read during the year. I. A graphic account, by W. J. McLean, chief trader of the Hudson's Bay Company, of the events of "The Fort Pitt Massacre," and his capture by the Indians under Big Bear.

II. "Our Library Treasures," being a description, by Rev. Dr. Bryce, of the very valuable library belonging to the Society, and the story of its acquisition.

III. "Important Bird Records in Manitoba," by A. E. Atkinson. A well-illustrated and very useful transaction.

IV. A reprint, by Rev. Dr. Bryce, of three transactions on "The Mound Builders," which had gone out of print. These were republished under the name "Among the Mound-Builders' Remains"—illustrated.

V. "The Annual Report of the Society," containing an account of the election of new, honorary and corresponding members, accessions to the library, exchanges, etc.

The establishment of new science professorships in the University of Manitoba during the present year, and the foundation of a well-equipped Agricultural College near the city of Winnipeg, may be expected to give additional assistance in carrying on the work of the Society, especially on its scientific side.

With increased facilities in the new Carnegie Library, and the addition of new workers in University and Agricultural College circles, gives promise of a vigorous and prosperous season for the Society year of 1904-05.

XIV.—From *The Canadian Institute*, Toronto, through Dr. RAMSAY WRIGHT.

The past year has been a prosperous one for the Institute, both as regards the excellence of the papers read and the character of the audiences attending it. The opening address, which was also the first

of the "Sir Sandford Fleming Lectures," was given by Dr. L. O. Howard of Washington, on "Some International Work with Insects," and formed an admirable introduction to the series.

Twenty-one meetings were held, at which twenty-four papers were read on the following subjects:—Geology, Physiography, Biology, Physics, Economics, Bibliography and History, Photography, Ethics, Miscellaneous.

Eight ordinary members and three associates have been added to the roll, while twelve members have been lost by death or resignation.

The Library has been extensively consulted both by members and non-members.

A. P. COLEMAN,
President.

LIBRARIAN'S REPORT.

Donations	130
Total number of Exchanges received . . .	2,290
Accession of volumes bound	163
Total number of books and periodicals taken out during the year	1,083

REPORT OF BIOLOGICAL SECTION.

The Biological Section of the Institute held thirteen general meetings during the session, papers being read on the following subjects:—Microscopy, Ornithology, Botany, Biology, Economics. Several outings were enjoyed by the members and their friends.

At the annual meeting, held on the 18th of April, 1904, the following officers were elected:—

President—Mr. John Maughan.

1st Vice-President—Mr. Dillon-Mills.

2nd Vice-President—Mr. R. W. King.

3rd Vice-President—Mr. J. B. Williams.

Secretary—Mr. Wm. Spry.

Curator—Mr. C. Armstrong.

Council—Messrs. A. Elvins, John Young, A. Sinclair, Miss Wilkes, Mr. Arthur Laughlen.

XV.—From *The New Brunswick Loyalists' Society*, through
DR. A. A. STOCKTON.

As the delegate from the New Brunswick Loyalists' Society to attend the meetings of the Royal Society of Canada, held at St. John,

N.B., in June, 1904, I beg to report on behalf of the Society, as follows:—

The New Brunswick Loyalists' Society was organized May 13, 1889. Its first President was the late Sir Leonard Tilley. On his death, in 1896, William Bayard, M.D., LL.D., was elected President, and he has continued in that position to the present time. A personal reference to Dr. Bayard may not be out of place. For over fifty years he has stood at the head of the medical profession in this province, and now, at the venerable age of ninety years, he still continues to practice his profession, his intellect clear and active, with a keen and lively interest in all affairs of life. The Society naturally feels proud of its President. The object of the Society is to perpetuate the memory and principles of the Loyalists, and to bring their descendants into closer associations and bonds of sympathy. Only those who are descended from the Loyalists of 1783 are eligible for membership. The person applying for membership must state, in his or her written application, the name of the Loyalist ancestor, the place of residence of such ancestor in the old colonies, the date of arrival and place of settlement in this country, the number of members in the family arriving, with all other facts of importance connected with their history during the Revolution and subsequent to their arrival in the land of their adoption. The Society has records of a large number of families of Loyalist descent, which, it is hoped, may in the future prove of great historical value. Lists of Loyalists who settled in New Brunswick are now being printed in successive numbers of the "Record," published by the New York Historic Genealogical Society. These lists are being furnished by Mr. D. R. Jack, of this city, the Corresponding Secretary of our Society.

From time to time papers of a patriotic and historical nature have been read before the Society, but as yet none of these papers have been published. The Society meets every month, and the meetings are of considerable interest.

XVI—*Report of the Botanical Club of Canada for 1903-4,*

By the General Secretary, A. H. MacKay, LL.D.

The annual meeting of the Club was held in the High School Building, Saint John, New Brunswick, on the 24th of June, 1904,—Dr. James Fletcher in the chair and Dr. H. M. Ami, Secretary. The General Secretary presented his report of the work done during the year, which was discussed by Dr. G. U. Hay of Saint John; Professor W. F. Ganong of Smith College, Massachusetts; Professor James Fowler of Kingston, Ontario; Professor L. W. Bailey of Fredericton; Dr. James Fletcher of Ottawa; and Dr. H. M. Ami of Ottawa. It was agreed that more work should be undertaken by the Club; that the observation of phenological facts be extended wherever possible; that the botanical exploration of all parts of the Dominion should be stimulated; that the extension of the range of the species in Macoun's list of the plants of Canada should be systematically commenced, the first volume being taken as one of the tasks for the year; and that the following committee be asked to consider and report upon additional work which the Club might most profitably undertake, viz.: Dr. James Fletcher, Dr. A. H. MacKay, Dr. G. U. Hay, J. R. Anderson of Victoria, and Rev. W. A. Burman of Winnipeg.

The following officers were elected for next year:

Honorary President: John Macoun, M.A., F.L.S., Ottawa.

President: Geo. U. Hay, D.Sc., Saint John, New Brunswick.

General Secretary-Treasurer: A. H. MacKay, LL.D., Halifax, Nova Scotia.

Secretaries for the Provinces:

Nova Scotia: Principal E. J. Lay, Academy, Amherst.

New Brunswick: James Vroom, Esq., St. Stephen.

Prince Edward Island: John MacSwain, Esq., Charlottetown.

Quebec: Rev. Robert Campbell, M.A., D.D., Montreal.

Ontario: James Fletcher, LL.D., F.L.S., Ottawa.

Manitoba: Rev. W. A. Burman, B.D., Winnipeg.

Assiniboia: Mr. Thos. R. Donnelly, Pheasant Forks.

Northwest Prov. and Territories generally: T. N. Willing, Esq., Regina.

Alberta: Percy B. Gregson, Esq., Blackfalds.

Saskatchewan: Rev. C. W. Bryden, B.A., Shellbrook.

British Columbia (Mainland): J. K. Henry, B.A., High School, Vancouver.

Vancouver Island, B.C.: A. J. Pineo, B.A., High School, Victoria.

The exchange and determination of species can be most effectively made by

JAMES M. MACOUN,

*Curator of the Herbarium,
Department of the Geological Survey,*

OTTAWA, ONT.

Object and Constitution, etc., of the Botanical Club of Canada.

The Botanical Club of Canada was organized by a committee of section four of the Royal Society of Canada, at its meeting in Montreal, May 29th, 1891.

The object is to promote by concerted local efforts and otherwise, the exploration of the flora of every portion of British America, to publish complete lists of the same in local papers as the work goes on, to have these lists collected and carefully examined in order to arrive at a correct knowledge of the precise character of our flora and its geographical distribution, and to carry on systematically seasonal observations on botanical phenomena.

The intention is to stimulate, with the least possible paraphernalia of constitution or rules, increased activity among botanists in each locality, to create a corps of collecting botanists wherever there may be few or none at present, to encourage the formation of field clubs, to publish lists of local floras in the local press, to conduct from year to year exact phenological observations, etc.; for which purposes the secretaries for the provinces may appoint secretaries for counties or districts, who will be expected, in like manner, to transmit the same impetus to as many as possible in their more local spheres of action.

Members and secretaries, while carrying out plans of operation which they may find to be promising of success in their particular districts, will report as frequently as convenient to the officer under whom they may be immediately acting.

Before the end of January, at the latest, reports of the work done within the various provinces during the year ended December the 31st previous, should be made by the secretaries for the provinces to the general secretary, from which the annual report to the Royal Society shall be principally compiled. By the first of January, therefore, the annual reports of county secretaries and members should be sent in to the secretaries of the provinces.

To cover the expenses of official printing and postage, a nominal fee of twenty-five cents per annum is expected for membership (or one dollar for five years in advance, or five dollars for life membership). Secretaries for the provinces, when remitting the amount of fees from mem-

bers to the general treasurer, are authorized to deduct the necessary expenses for provincial office work, transmitting vouchers for the same with the balance.

The names of those reporting any kind of valuable botanical work during the year will be published in the list of active members, even should the payment of fees be forgotten. All payments are credited to the current year and the future. Lapsed active membership can, therefore, be restored at any time without the payment of arrears—for no *arrears* are charged in the Botanical Club of Canada.

PHENOLOGICAL OBSERVATIONS, CANADA, 1903.

OBSERVERS, ETC. FOR THE FIRST TABLE FOLLOWING.

Nova Scotia: The average of about 300 selected schedules.

Prince Edward Island: Mr. John MacSwain, Charlottetown.

New Brunswick: Geo. U. Hay, D.Sc., F.R.S.C., Saint John; J. Baxter, M.D., Chatham.

Quebec: Miss A. M. Dresser, St. François Xavier, Brompton, Richmond Co.; Miss J. M. Varney, Richmond, Richmond Co.

Ontario: Cephas Guillet, Ph.D., Ottawa; Mr. A. B. Klugh, Guelph, Wellington Co.; Mrs. F. E. Webster, Creemore, Simcoe Co.; J. H. Elliott, M.B., Gravenhurst, Muskoka.

Assiniboia: Mr. Thos. R. Donnelly, Pheasant Forks.

Alberta: Mr. Percy B. Gregson, Blackfalds.

British Columbia: J. K. Henry, B.A., Vancouver.

The first table of phenochrons contains the observations of this staff of observers at the stations indicated, the observations being confined to the "time when first seen" except where indicated in a few cases.

The second table gives the phenochrons for each of the ten biological regions into which the Province of Nova Scotia has been provisionally subdivided, each phenochron being the average of a few or many observations within the region. Over 300 selected schedules of observations are represented in this summation.

The schedules of the school teachers who directed the observations at each school were sent in at the end of the school year to the inspectors who transmitted them to the Superintendent of Education for the province, who in turn submitted them to the following staff for criticism, selection, and compilation into "belt" and "region" phenochrons. The critical reports of each of this staff of phenologists were published in the April *Journal of Education*, 1904, pages 74 to 81, for the benefit of the observers for next year.

Region I. (Yarmouth and Digby Co.): Principal A. W. Horner, Yarmouth.

Region II. (Shelburne Co.): Principal C. Stanley Bruce, Shelburne.

Region II. (Queens Co.): Miss Minnie C. Hewitt, Science Teacher, Lunenburg Academy.

Region II. (Lunenburg Co.): Principal Burgess McKittrick, Lunenburg.

Region III. (Annapolis and Kings Co.): Principal Ernest Robinson, Kentville.

Region IV. (Hants Co.): J. E. Barteaux, Science Master, Truro Academy.

Region V. (Halifax and Guysboro Co.): Principal G. R. Marshall, Halifax.

Region VI. (Cum. & Col. on Cobequid Bay): J. E. Barteaux, Truro.

Region VII. (Cum. & Col. North slope): Principal E. J. Lay, Amherst.

Region VII. (Pictou and Antigonish Co.): W. P. Fraser, Science Master, Pictou Academy.

Region VIII. (Richmond Co.): Principal Geo. W. McKenzie, Sydney Mines.

Region VIII. (Cap Breton Co.): Loran A. DeWolfe, Science Master, North Sydney.

Region IX. (Victoria Co.): Loran A. DeWolfe, M.Sc., North Sydney.

Region X. (Inverness Co. sloping to Gulf): Loran A. DeWolfe.

The compilations of this staff were further reduced into the form published in the second table, "The Phenochrons of Nova Scotia, 1903," by Miss Jean Lindsay, Halifax. The phenochrons of the several divisions of the province, as well as the individual schedules are bound into annual volumes for the convenience of preservation and of the study of future phenologists.

In previous reports attention was called to the phenological work in other countries, especially that of Mr. Edward Hawley, F. R. Met. Soc., F.R.H.S., in England; of Dr. Ihne of Darmstadt, in Europe; and of the public school work of Michelsen and Mathiassen in Denmark, on Nova Scotian lines. Nothing strikingly new has appeared during the year abroad or at home in this department. The Marine Biological Station of Canada under the directorship of Professor Ramsay Wright of Toronto University, was working at Malpeque in Prince Edward Island during the year. Incidentally botanical work was done, more particularly the determination of the microscopic flora on which the

oysters of the region feed. Mr. A. B. Klugh of the Wellington Field Naturalists' Club published valuable botanical papers during the season, and the Guelph *Herald* distinguished itself by the publication of an interesting series of botanical and other natural history articles and notes from members of the club. The *Ottawa Naturalist* had a specially valuable series of articles on Nature Study. The Journal of Education of Nova Scotia functions as the organ of the phenological observations of the province. The Bibliography of Canadian Botany for the year is presented to the Royal Society in a special report as usual.

The botanical nomenclature used in the tables following is that of the latest edition of Gray's Manual, and the names of the birds are those of the American Ornithological Union.

PHENOLOGICAL OBSERVATIONS, CANADA, 1903.

OBSERVATION STATIONS.

Number	Day of the year 1903 corresponding to the last day of each month. Jan 31 July.....212 Feb 59 Aug.....242 March 90 Sept.....273 April 120 Oct .....304 May 151 Nov.....334 June 181 Dec.....365 For Leap Year add one to each except January.	Average dates for:													
		Nova Scotia	Charlottetown, P.E.I.	St. John, N.B.	Chatham, N.B.	Brompton, Que.	Richmond, Que.	Ottawa, Ont.	Guelph, Ont.	Creemore, Ont.	Gravenhurst, Ont.	Pheasant Forks, Assa.	Blackfalds, Alberta.	Vancouver, B.C.	
1	<i>Alnus incana</i> , Willd.....	104	...	...	109	84	73	99	80	...	106	...	*149	...
2	<i>Populus tremuloides</i>	118	128	...	113	...	...	99	90	...	106	133	130	...
3	<i>Epigæa repens</i> , L.....	102	118	...	115	99	100	101	...	...	102	...	...	...
4	<i>Equisetum arvense</i>	127	...	...	132	...	...	...	*110	...	121	...	138	90
5	<i>Sanguinaria Canadensis</i>	125	...	...	...	...	...	109	...	...	...	...	...	...
6	<i>Viola blanda</i>	121	...	...	132	113	119	117	112	*132	107	...	...	...
7	<i>Viola palmata</i> , <i>cucullata</i>	123	...	129	143	120	122	118	118	*119	116	...	140	...	
8	<i>Hepatica triloba</i> , etc.	118	...	...	...	...	93	89	90	89	79	...	100	...
9	<i>Acer rubrum</i>	126	137	...	121	119	107	104	97	...	106	...	...	96
10	<i>Fragaria Virginiana</i>	123	...	129	..	119	100	112	118	...	105	124	144	...	
11	“ “ (fruit ripe).....	163	...	...	179	148	151	150	158	...	...	178	170	...
12	<i>Taraxacum officinale</i>	126	142	...	141	119	116	109	90	*100	106	133	...	...
13	<i>Erythronium Americanum</i>	133	...	129	143	112	113	107	116	*100	104	...	...	...
14	<i>Coptis trifolia</i>	131	...	136	143	106	...	120	118	...	126	...	...	...
15	<i>Claytonia Caroliniana</i>	123	...	...	...	...	...	90	...	...	79	...	...	...
16	<i>Nepeta Glechoma</i>	140	...	...	...	...	...	*132	...	...	...	...	...	108
17	<i>Amelanchier Canadensis</i>	140	...	136	135	...	...	119	129	*129	124	149	148	...
18	“ “ (fruit ripe).....	196	...	...	...	...	...	...	193	...	...	210	183	...
19	<i>Prunus Pennsylvanica</i>	143	...	151	...	132	124	128	132	*134	127	...	144	120	
20	“ “ (fruit ripe).....	221	...	...	...	...	...	...	212	...	...	...	...	...
21	<i>Vaccinium Can. and Penn.</i>	141	...	145	143	...	...	119	120	...	122	...	...	...
22	“ “ (fruit ripe).....	195	...	...	...	...	...	...	188	...	...	...	...	...
23	<i>Ranunculus acris</i>	148	...	...	136	141	132	136	136	...	140	119	166	...
24	<i>R. repens</i>	154	...	...	...	...	...	160	...	*132	...	...	...	...
25	<i>Trillium erythrocarpum</i>	147	...	136	143	134	116	*126	115	...	131	...	...	...
26	<i>Rhododendron Rhodora</i>	145	...	145	...	...	...	...	...	...	...	...	...	...
27	<i>Cornus Canadensis</i>	151	...	145	157	...	...	*140	143	...	146	...	...	...
28	“ “ (fruit ripe).....	208	...	...	...	...	...	...	198	...	...	...	...	...
29	<i>Trientalis Americana</i>	150	...	151	157	119	150	135	144	...	144	...	...	...
30	<i>Clintonia borealis</i>	152	...	151	167	...	...	*142	135	...	144	...	...	...
31	<i>Calla palustris</i>	159	...	...	155	149	117	154	...	...	141	...	...	...

* When becoming common.

† The phenochrons for Nova Scotia are the averages of over 300 selected schedules, the fractions being omitted. In some of the schedules from the Western Provinces of Canada, the cognate western species are taken as indicated exactly in previous reports.

PHENOLOGICAL OBSERVATIONS, CANADA, 1903.

OBSERVATION STATIONS.

Number	Day of the year 1903 corresponding to the last day of each month.	Average dates for										
		Nova Scotia.										
	Jan. 31	July 212										
	Feb. 59	Aug. 242										
	March. 90	Sept. 273										
	April. 120	Oct. 304										
	May 151	Nov. 334										
	June 181	Dec. 365										
	For Leap Year add one to each except January.											
		+	Charlottetown, P.E.I.	St. John, N.B.	Chatham, N.B.	Brompton, Qué.	Richmond, Qué.	Ottawa, Ont.	Guelph, Ont.	Greenore, Ont.	Gravenhurst, Ont.	Pheasant Forks, Assa.
												Blackfalds, Alberta.
												Vancouver, B.C.
32	Cypripedium acaule.....	159	167	167	139	119	138	147	150	139		
33	Sisyrinchium angustifolium.....	160	179	139	119	138	149	149	154	158	166	
34	Linnaea borealis	167	172	118	149	149	154	131				
35	Kalmia glauca.....	150	162	147	131							
36	Kalmia angustifolia.....	168	179	161								
37	Crataegus Oxyacantha.....	161	162	144								
38	Crataegus coccinea, etc.....	157										
39	Iris versicolor.....	170										
40	Chrysanthemum Leucanthemum.....	166					*156	149				
41	Nuphar advena.....	163					142	159				
42	Rubus strigosus.....	164					141	145	*156	141	173	
43	" " (fruit ripe).....	214					186			210		
44	Rhinanthus Crista-galli.....	171										
45	Rubus villosus.....	166	171	148	149	*161	141				126	
46	" " (fruit ripe).....	241					206					
47	Sarracenia purpurea.....	144					*161	144				
48	Brunella vulgaris.....	172	179	159	154	153						
49	Rosa lucida.....	178		153	145					166	165	164
50	Leontodon autumnale.....	168	160									152
51	Linaria vulgaris.....	168					161					
52	Trees appear green	138					129	134	132			
53	Ribes rubrum (cultivated).....	142							*131			
54	" " (fruit ripe).....	199					189			210		
55	R. nigrum (cultivated).....	134										
56	" " (fruit ripe).....	210					193		*182			
57	Prunus Cerasus.....	147	160	132					*130			109
58	" " (fruit ripe).....	205										
59	Prunus domestica.....	151		129	128				*130			
60	Pyrus malus.....	151	157	136	131	131			*132			117
61	Syringa vulgaris.....	162	166	158	142	139	134		*141			130
62	Trifolium repens.....	162					149	139		143	164	133

* When becoming common.

† The phenochrons for Nova Scotia are the averages of over 300 selected schedules, the fractions being omitted. In some of the schedules from the Western Provinces of Canada, the cognate western species are taken as indicated exactly in previous reports.

PHENOLOGICAL OBSERVATIONS, CANADA, 1903.

OBSERVATION STATIONS.

Number	Day of the year 1903 corresponding to the last day of each month.		Average dates for												
	Jan. 31	July. 212	Nova Scotia.	Charlottetown, P.E.I.	St. John, N.B.	Chatham, N.B.	Brompton, Que.	Richmond, Que.	Ottawa, Ont.	Guelph, Ont.	Creemore, Ont.	Gravenhurst, Ont.	Pheasant Forks, Assa.	Blackfalds, Alberta.	Vancouver, B.C.
Feb. 59		Aug. 242													
March. 90		Sept. 273													
April. 120		Oct. 304													
May. 151		Nov. 334													
June. 181		Dec. 365													
For Leap Year add one to each except January.			†												
63	Trifolium pratense.....		160				149	141	139			147			139
64	Phleum pratense.....		174												
65	Solanum tuberosum.....		182					169			184				
66	Ploughing (first of season).....		113				121	80	89		91			93	
67	Sowing " ".....		123	127			129	117	104		105			96	
68	Potato-planting " ".....		123				145	120	142		138			115	
69	Sheep-shearing " ".....		129				139							166	
70	Hay-cutting " ".....		200											220	
71	Grain-cutting " ".....		246	239					205					228	
72	Potato-digging " ".....		266						278		274			220	
73a	Opening of rivers " ".....		71	88					75		67			105	
73b	Opening of lakes " ".....		89						83					128	
74a	Last snow to whiten ground.....		116			115	95	113	94		84		119	140	
74b	" " to fly in air.....		130			115	121	113	111		86			140	
75a	Last spring frost—hard.....		140	146		101	152		122				161	142	
75b	" " hoar.....		158						124				162	142	
76a	Water in streams—high.....		89					79			79		247	223	
76b	" " low.....		193						158					312	
77a	First autumn frost—hoar.....		257						283					245	
77b	" " hard.....		284											312	
78a	First snow to fly in air.....		290					296	281				252	255	
78b	" " whiten ground.....		306	351				331	330		299		255	255	
79a	Closing of Lakes.....		339						335					320	
79b	" " Rivers.....		344	351					340					320	
81a	Wild ducks migrating, N.....		85			90	54	61		91			100	93	
81b	" " S.....		302						286						
82a	" geese " N.....		78	75		71		66	100	86			98	93	
82b	" " S.....		318	246					285				31		
83	Melospiza fasciata, North.....		84	87		100		110	78	68	73				
84	Turdus migratorius ".....		78	85		79	65	65	75	70	60		103	110	
85	Junco hiemalis ".....		81	96		86	56		78	Res.					

* When becoming common.

† The phenochrons for Nova Scotia are the averages of over 300 selected schedules, the fractions being omitted. In some of the schedules from the Western Provinces of Canada, the cognate western species are taken as indicated exactly in previous reports.

PHENOLOGICAL OBSERVATIONS, CANADA, 1903.

OBSERVATION STATIONS.

Number	Day of the year 1903 corresponding to the last day of each month.		Average dates for													
	Jan. 31	July. 212	†	Nova Scotia,	Charlottetown, P.E.I.	St. John, N.B.	Chatham, N.B.	Brompton, Que.	Richmond, Que.	Ottawa, Ont.	Guelph, Ont.	Creemore, Ont.	Gravenhurst, Ont.	Pheasant Forks, Assa.	Blackfalds, Alberta.	Vancouver, B.C.
	Feb. 59	Aug. 243														
	March 90	Sept. 273														
	April. 120	Oct. 304														
	May 151	Nov. 334														
	June. 181	Dec. 365														
	For Leap Year add one to each except January.															
86	Actitis macularia, North.....		131				147			122	127	130				
87	Sturnella magna "		121							101	76	131		96		
88	Ceryle Alcyon "		125				128	115		117	99	115		151		
89	Dendroica coronata "		137				141		109		122					
90	D. æstiva "		138				146			130	124					
91	Zonotrichia alba "		116				126			119	109					
92	Trochilus colubris "		147				151				140					
93	Tyrannus Carolinensis "		136				140			141	124	131		119		
94	Dolichonyx oryzivorus "		136				147	138	137	141	128					
95	Spinis tristis "		145				145			115	Res	129				
96	Setophaga ruticilla "		133				148			135	129					
97	Ampelis cedrorum "		144				159				130			107		
98	Chordeiles Virginianus "		128	164			152			141	140			148		
99	First piping of frogs.....		100	119			111	99	82	78	73			105	112	
100	First appearance of snakes.....		110					115	84	85	78			109		

† The phenochrons for Nova Scotia are the averages of over 300 selected schedules, the fractions being omitted. In some of the schedules from the Western Provinces of Canada, the cognate western species are taken as indicated exactly in previous reports.

FLOWERING AND OTHER PHENOCHRONS FOR EACH REGION OF THE PROVINCE OF NOVA SCOTIA, COMPILED FROM 300 PUBLIC SCHOOL OBSERVATION SCHEDULES.

THE PHENOCHRONS FOR EACH REGION (WHICH ARE AVERAGES OF MANY OBSERVATIONS) HAVE THE FRACTIONS OMITTED!.

[illegible]

FLOWERING AND OTHER PHENOCHRONS FOR THE PROVINCE OF NOVA SCOTIA.—(Continued).

WHEN FIRST SEEN.		YEAR ENDED JULY, 1903.		WHEN BECOMING COMMON.												
REGIONS.		NOVA SCOTIA.		REGIONS.												
1. Yarmouth and Digby.	2. Shelburne, Queens and Lunenburg.	3. Annapolis and Kings.	4. Hants and South Colchester.	5. Halifax and Guysboro.	6. South (Cobequid Slope (S. Cumb. and Col.)	7. North Cumb. Col., Pictou and Antig.	8. Richmond and Cape Breton.	9. Bras d'Or Slope (Inv. and Victoria).	10. Inverness Slope to Gulf.							
Average for Province.		Average for Province.		Average for Province.		Average for Province.		Average for Province.								
Day of the year corresponding to the last day of each month.		Day of the year corresponding to the last day of each month.		Day of the year corresponding to the last day of each month.		Day of the year corresponding to the last day of each month.		Day of the year corresponding to the last day of each month.								
Jan.....	31	July.....	212	27	Cornus Canadensis	158.7	146.1	150.8	157.157	168.3						
Feb.....	59	Aug.....	243	28	" fruit ripe....	220.	239.0	208.4	233.239.	218.						
March.....	90	Sept.....	273	29	Trientalis Americana	156.7	146.6	148.1	148.5	154.4	157	154.4	155.1	170.2	167.	165.5
April.....	120	Oct.....	304	30	Clintonia borealis	158.7	154.0	154.2	152.159.6	166	153.5	162.1	175.	152.		
May.....	151	Nov.....	334	31	Calla palustris.	164.8	174.2	171.1	161.9	166.2	169.9	174	172.	175.6	178.3	181.
June.....	181	Dec.....	365	32	Cypripedium acule.	164.2	156.7	154.158.7	166.168	161.9	167.7	177.	168.	156.		
				33	Sisyrinchium angustifol	166.7	157.8	156.4	159.8	163.6	171	164.2	166.7	176.6	173.5	177.1
				34	Linnaea borealis	171.1	161.0	161.9	166.2	169.9	174	172.	175.6	178.3	181.	
				35	Kalmia glauca	157.3	147.7	150.1	156.5	146.9	154	159.8	159.9	174.	158.	166.5
				36	Kalmia angustifolia	174.	156.4	168.7	172.6	179.5	170	180.	180.6	170.	188.	
				37	Crataegus oxyacantha	166.5	166.5	158.5	163.2	161.1	171	169.	169.6	171.	169.	
				38	Crataegus coccinea, etc	163.	158.3	155.8	159.4	165.3	165.8	164.	172.2			
				39	Iris versicolor	175.7	165.3	169.3	174.1	176.2	176	175.3	173.	182.1	183.	182.7
				40	Chrysanthemum Leucanth	174.7	166.	168.	171.6	173.	177	170.6	172.1	182.2	184.	183.2

FLOWERING AND OTHER PHENOCHRONS FOR THE PROVINCE OF NOVA SCOTIA.—(Continued).

WHEN FIRST SEEN.		WHEN BECOMING COMMON.	
REGIONS.		REGIONS.	
YEAR ENDED JULY, 1903.		NOVA SCOTIA.	
		Day of the year corresponding to the last day of each month.	
		Average for Province.	
		1. Yarmouth and Digby.	
		2. Shelburne, Queens and Lunenburg.	
		3. Annapolis and Kings.	
		4. Hants and South Colchester.	
		5. Halifax and Guysboro.	
		6. (S. Cumb. and Col.) (S. Cumb. and Col.)	
		7. North Cumb., Col., Pictou and Antigonish.	
		8. Richmond and Cape Breton.	
		9. Bras d'Or Slope (Inv. and Victoria).	
		10. Inverness Slope to Gulf.	
		10. Inverness Slope to Gulf.	
41	Nuphar advena	170.8 175.	166.1 171.3 174.
42	Rubus strigosus	170.9 163.3 162.4 171.3 163.	171
43	" fruit ripe	222.9 212.0 213.3 218.	225.2
44	Rhinanthus Crista-galli	176.5 174.2 174.5 177.5 180.8	171
45	Rubus villosus	173.3 168.7 167.6 175.5 173.7	170
46	" fruit ripe	249.8 236.0 243.2 237.	253.
47	Sarracenia purpurea	171.3 172.4 173.9 171.	167
48	Brunella vulgaris	176. 173.9 174.4 180.1 177.4	170
49	Rosa lucida	183.4 184.2 182.3 185.5 178.	179
50	Leontodon autumnale	174.7 173.2 173.6 174.9 175.1	174
51	Linaria vulgaris	183.2 230.	190
52	Trees appear green	152.2 142. 140.4 161.3 153.5	154
53	Ribes rubrum (cultivated)	148.8 137.7 138.7 145.2 147.4	149
54	" (fruit ripe)	216.7 217.0 202.5	214.0
171.8 155.9 167.7 165.2 171		151. 163.9	
159.3 157.1 157.6 161.5 163		172.5 168.5 164.	
199.0 207.2 207.5 219.5		209.5 214.2	
163.2 167.3 171. 177.1 175		171.9	
159.2 160.9 167.4 168.4 163		166.9	
235.4 229.5 229. 240.		237. 241.3	
161.1 167.4 164. 167.		168. 166. 170. 159.	
164.7 168.5 173.6 173.2		180. 176.5	
177.7 175.4 179.8 179.		179 173.8 179.4	
162.6 163.6 166.5 166.2 173		166.4 169.1	
149.0 195.		168.5 169.3	
129.7 135.4 132.8 139.2 138		134.3 140. 154. 145.	
131.3 133.3 138.1 142.2 141		143. 142.6 154.6 154.5 147.1 142.8	
187.8 186.5 184. 195.5		199. 239.	
		207. 199.75	

FLOWERING AND OTHER PHENOCHRONS FOR THE PROVINCE OF NOVA SCOTIA.—(Continued).

WHEN FIRST SEEN.		YEAR ENDED JULY, 1903		WHEN BECOMING COMMON.						
REGIONS.		NOVA SCOTIA.		REGIONS.						
1. Yarmouth and Digby.	2. Shelburne, Queens and Lunenburg.	3. Annapolis and Kings.	4. Hants and South Colchester.	5. Halifax and Guysboro.	6. South Cobequid Slope (S. Cumb. and Col.)	7. North Cumb. Col., Pictou and Antig.	8. Richmond and Cape Breton.	9. Bras d'O'Slope (Inv. and Victoria).	10. Inverness Gulf.	
Average for Province.		Average for Province.		Average for Province.		Average for Province.		Average for Province.		
Day of the year corresponding to the last day of each month.		Day of the year corresponding to the last day of each month.		Day of the year corresponding to the last day of each month.		Day of the year corresponding to the last day of each month.		Day of the year corresponding to the last day of each month.		
Jan. 31	July	55 R. nigrum (cultivated)	150.8	149.8	141.6	149.4	148.6	149.7	149.8	151.3
Feb. 59	Aug.	56 " (fruit ripe)	219.9	201.1	217.1	219.9	217.1	219.9	219.9	219.5
March 90	Sept.	57 Prunus Cerasus	153.1	138.3	143.7	143.5	151.1	159.1	154.4	158.1
April 120	Oct.	58 " " fruit ripe	200.1	201.6	201.5	200.1	201.5	200.1	201.5	228.1
May 151	Nov.	59 Prunus domestica	157.6	143.4	143.8	146.1	155.2	160.1	157.8	175.3
June 181	Dec.	60 Pyrus Malus	159.6	147.4	147.8	157.4	169.6	164.1	155.4	175.5
		61 Syringa vulgaris	168.1	158.1	156.8	159.5	166.3	174.1	166.1	165.4
		62 Trifolium repens	168.9	158.2	161.1	164.9	164.6	171.1	168.8	169.1
		63 Trifolium pratense	167.7	151.9	156.9	165.8	166.7	168.1	171.4	170.2
		64 Phleum pratense	178.6	176.2	171.1	167.8	178.6	171.1	183.1	175.8
		65 Solanum tuberosum	190.1	183.1	190.1	182.1	182.1	190.1	183.1	175.8
		66 Ploughing (first of season)	124.1	110.5	117.5	128.6	128.6	124.1	130.1	126.5
		67 Sowing " "	134.1	123.6	123.4	131.3	131.3	134.1	136.1	141.8
		68 Potato-planting (first of season)	129.9	118.5	123.6	130.4	130.4	130.1	137.1	131.5

FLOWERING AND OTHER PHENOCHRONS FOR THE PROVINCE OF NOVA SCOTIA.—(Continued).

WHEN FIRST SEEN.				YEAR ENDED JULY, 1903.				WHEN BECOMING COMMON.											
Regions.				NOVA SCOTIA.				Regions.											
1. Yarmouth and Digby.	2. Shelburne, Queens and Lunenburg.	3. Annapolis and Kings.	4. Hants and South Colchester.	5. Halifax and Guysboro.	6. South Cobequid Slope (S. Cumb. and Col.)	7. North Cumb., Col., Pictou and Cape Breton.	8. Richmond and Cape Breton.	9. Bras d'Or Slope (Inv. and Victoria).	10. Inverness Slope to Gulf.	Average for Province.					Day of the year corresponding to the last day of each month.				
122.6123.9125.3134.9	131	141.6135.1128.2126.2123.8129.3	212	201.0205.213.1	209.7200.5	69 Sheep-Shearing (first of season)	139.7134.0132.5137.1	148	149.	139.5144.	133.9	10. Inverness Slope to Gulf.							
182.1188.2180.2213.	212	201.0205.213.1	209.7200.5	70 Hay-cutting	210.199.0199.	"	202.1	219	211.	223.5	216.2	9. Bras d'Or Slope (Inv. and Victoria).							
246.2234.8236.3246.8	249	255.3238.8251.3	250.2246.1	71 Grain-cutting	253.1255.0246.	"	250.5	262	247.	255.5	255.9	8. Richmond and Cape Breton.							
242.0259.8260.2269.6	272	265.8269.1277.8274.	270.4266.1	72 Potato-digging	275.8261.0270.	"	274.7	275	279.	285.5277.	281.	7. North Cumb., Col., Pictou and Antig. Breton.							
62.7 66.3 72.2 58.9	81	69.3 65.1 88.0 65.	85. 71.4	73aOpening of rivers.								6. (S. Cumb. and Col.) South Cobequid Slope.							
67.4 76.3 81.386.5	92	92.3 96.1104.5101.	95. 89.2	73bOpening of lakes								5. Halifax and Guysboro.							
105.6103. 105.6117.3	121	113.3120.7109.3134.	129.9116.	74aLast snow to whiten ground								4. Hants and South Colchester.							
107.3110.4108.6132.9	135	129.2139.9145.3156.	142. 130.7	74b " to fly in air.								3. Annapolis and Kings.							
140.2127.3138.8149.5	131	150.7147.8144.9135.	136.5140.2	75aLast Spring frost—hard								2. Shelburne, Queens and Lunenburg.							
147.6151.2158.1172.3	151	155.7161.1157. 163.5164.	158.1	75b " " hoar.								1. Yarmouth and Digby.							
93.5 98.4 97.8230.7	.....	86.0 65.5.....	99.	76aWater in streams—high.								Average for Province.						
151.0154.6248. 175.5	.....	156.5220. 250.	191. 193.3	76b " " low.								Day of the year corresponding to the last day of each month.						
255.2256.5254.2261.1	259	255.3262.5271.8	242.5257.6	77aFirst autumn frost—hoar								Jan. 31 July 212							
290.4 289. 287. 284.1	288	267.5280.5287.6	285. 284.3	77b " " hard.								Feb. 59 Aug. 243							
												March. 90 Sept. 273							
												April. 120 Oct. 304							
												May. 151 Nov. 334							
												June. 181 Dec. 365							

FLOWERING AND OTHER PHENOCHRONS FOR THE PROVINCE OF NOVA SCOTIA.—(Continued).

WHEN FIRST SEEN.					YEAR ENDED JULY, 1903. NOVA SCOTIA.					WHEN BECOMING COMMON.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
REGIONS.					REGIONS.					REGIONS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
1. Yarmouth and Digby.	2. Shelburne, Queens and Lunenburg.	3. Annapolis and Kings.	4. Hants and South Colchester.	5. Halifax and Guysboro.	6. South (Cobequid Slope (S. Cumb. and Col.)	7. North Cumb. Col. Pictou and Antig.	8. Richmond and Cape Breton.	9. Bras d'Or Slope (Inv. and Victoria).	10. Inverness Slope to Gulf.	Average for Province.	Day of the year corresponding to the last day of each month.	1. Yarmouth and Digby.	2. Shelburne, Queens and Lunenburg.	3. Annapolis and Kings.	4. Hants and South Colchester.	5. Halifax and Guysboro.	6. South (Cumb. and Col.)	7. North Cumb. Col. Pictou and Antig.	8. Richmond and Cape Breton.	9. Bras d'Or Slope (Inv. and Victoria).	10. Inverness Slope to Gulf.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
297.9309.3281.6285.5	295	282.	280.8297.	291.	286.4290.6	78a	First snow to fly in air.....	Jan.....31	July.....212	Feb.....59	Aug.....243	March.....90	Sept.....273	April.....120	Oct.....304	May.....151	Nov.....334	June.....181	Dec.....365	Average for Province.	1. Yarmouth and Digby.	2. Shelburne, Queens and Lunenburg.	3. Annapolis and Kings.	4. Hants and South Colchester.	5. Halifax and Guysboro.	6. South (Cumb. and Col.)	7. North Cumb. Col. Pictou and Antig.	8. Richmond and Cape Breton.	9. Bras d'Or Slope (Inv. and Victoria).	10. Inverness Slope to Gulf.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
327.4327.2303.4309.9	303	290.5	289.5315.5299.	304.1306.9	78b	" " " " " " " " " " " "	78a	Closing of lakes	79a	" " " " " " " " " " " "	79b	" " " " " " " " " " " "	81a	Wild ducks migrating, N	81b	" " " " " " " " " " " "	82a	" geese	82b	" " " " " " " " " " " "	83	Melospiza fasciata, North	84	Turdus migratorius	85	Junco hiemalis	86	Actitis macularia	87	Sturnella magna	88	Ceryle Alcyon																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
342.6339.8357.	319.5	335	339.1342.5	343.	339.8	79b	" " " " " " " " " " " "	81b	" " " " " " " " " " " "	82a	" " " " " " " " " " " "	82b	" " " " " " " " " " " "	83	Melospiza fasciata, North	84	Turdus migratorius	85	Junco hiemalis	86	Actitis macularia	87	Sturnella magna	88	Ceryle Alcyon	125.2	134.	128.	133.	139.	138.	137.	136.	135.	134.	133.	132.	131.	130.	129.	128.	127.	126.	125.	124.	123.	122.	121.	120.	119.	118.	117.	116.	115.	114.	113.	112.	111.	110.	109.	108.	107.	106.	105.	104.	103.	102.	101.	100.	99.	98.	97.	96.	95.	94.	93.	92.	91.	90.	89.	88.	87.	86.	85.	84.	83.	82.	81.	80.	79.	78.	77.	76.	75.	74.	73.	72.	71.	70.	69.	68.	67.	66.	65.	64.	63.	62.	61.	60.	59.	58.	57.	56.	55.	54.	53.	52.	51.	50.	49.	48.	47.	46.	45.	44.	43.	42.	41.	40.	39.	38.	37.	36.	35.	34.	33.	32.	31.	30.	29.	28.	27.	26.	25.	24.	23.	22.	21.	20.	19.	18.	17.	16.	15.	14.	13.	12.	11.	10.	9.	8.	7.	6.	5.	4.	3.	2.	1.	0.	-1.	-2.	-3.	-4.	-5.	-6.	-7.	-8.	-9.	-10.	-11.	-12.	-13.	-14.	-15.	-16.	-17.	-18.	-19.	-20.	-21.	-22.	-23.	-24.	-25.	-26.	-27.	-28.	-29.	-30.	-31.	-32.	-33.	-34.	-35.	-36.	-37.	-38.	-39.	-40.	-41.	-42.	-43.	-44.	-45.	-46.	-47.	-48.	-49.	-50.	-51.	-52.	-53.	-54.	-55.	-56.	-57.	-58.	-59.	-60.	-61.	-62.	-63.	-64.	-65.	-66.	-67.	-68.	-69.	-70.	-71.	-72.	-73.	-74.	-75.	-76.	-77.	-78.	-79.	-80.	-81.	-82.	-83.	-84.	-85.	-86.	-87.	-88.	-89.	-90.	-91.	-92.	-93.	-94.	-95.	-96.	-97.	-98.	-99.	-100.	-101.	-102.	-103.	-104.	-105.	-106.	-107.	-108.	-109.	-110.	-111.	-112.	-113.	-114.	-115.	-116.	-117.	-118.	-119.	-120.	-121.	-122.	-123.	-124.	-125.	-126.	-127.	-128.	-129.	-130.	-131.	-132.	-133.	-134.	-135.	-136.	-137.	-138.	-139.	-140.	-141.	-142.	-143.	-144.	-145.	-146.	-147.	-148.	-149.	-150.	-151.	-152.	-153.	-154.	-155.	-156.	-157.	-158.	-159.	-160.	-161.	-162.	-163.	-164.	-165.	-166.	-167.	-168.	-169.	-170.	-171.	-172.	-173.	-174.	-175.	-176.	-177.	-178.	-179.	-180.	-181.	-182.	-183.	-184.	-185.	-186.	-187.	-188.	-189.	-190.	-191.	-192.	-193.	-194.	-195.	-196.	-197.	-198.	-199.	-200.	-201.	-202.	-203.	-204.	-205.	-206.	-207.	-208.	-209.	-210.	-211.	-212.	-213.	-214.	-215.	-216.	-217.	-218.	-219.	-220.	-221.	-222.	-223.	-224.	-225.	-226.	-227.	-228.	-229.	-230.	-231.	-232.	-233.	-234.	-235.	-236.	-237.	-238.	-239.	-240.	-241.	-242.	-243.	-244.	-245.	-246.	-247.	-248.	-249.	-250.	-251.	-252.	-253.	-254.	-255.	-256.	-257.	-258.	-259.	-260.	-261.	-262.	-263.	-264.	-265.	-266.	-267.	-268.	-269.	-270.	-271.	-272.	-273.	-274.	-275.	-276.	-277.	-278.	-279.	-280.	-281.	-282.	-283.	-284.	-285.	-286.	-287.	-288.	-289.	-290.	-291.	-292.	-293.	-294.	-295.	-296.	-297.	-298.	-299.	-300.	-301.	-302.	-303.	-304.	-305.	-306.	-307.	-308.	-309.	-310.	-311.	-312.	-313.	-314.	-315.	-316.	-317.	-318.	-319.	-320.	-321.	-322.	-323.	-324.	-325.	-326.	-327.	-328.	-329.	-330.	-331.	-332.	-333.	-334.	-335.	-336.	-337.	-338.	-339.	-340.	-341.	-342.	-343.	-344.	-345.	-346.	-347.	-348.	-349.	-350.	-351.	-352.	-353.	-354.	-355.	-356.	-357.	-358.	-359.	-360.	-361.	-362.	-363.	-364.	-365.	-366.	-367.	-368.	-369.	-370.	-371.	-372.	-373.	-374.	-375.	-376.	-377.	-378.	-379.	-380.	-381.	-382.	-383.	-384.	-385.	-386.	-387.	-388.	-389.	-390.	-391.	-392.	-393.	-394.	-395.	-396.	-397.	-398.	-399.	-400.	-401.	-402.	-403.	-404.	-405.	-406.	-407.	-408.	-409.	-410.	-411.	-412.	-413.	-414.	-415.	-416.	-417.	-418.	-419.	-420.	-421.	-422.	-423.	-424.	-425.	-426.	-427.	-428.	-429.	-430.	-431.	-432.	-433.	-434.	-435.	-436.	-437.	-438.	-439.	-440.	-441.	-442.	-443.	-444.	-445.	-446.	-447.	-448.	-449.	-450.	-451.	-452.	-453.	-454.	-455.	-456.	-457.	-458.	-459.	-460.	-461.	-462.	-463.	-464.	-465.	-466.	-467.	-468.	-469.	-470.	-471.	-472.	-473.	-474.	-475.	-476.	-477.	-478.	-479.	-480.	-481.	-482.	-483.	-484.	-485.	-486.	-487.	-488.	-489.	-490.	-491.	-492.	-493.	-494.	-495.	-496.	-497.	-498.	-499.	-500.	-501.	-502.	-503.	-504.	-505.	-506.	-507.	-508.	-509.	-510.	-511.	-512.	-513.	-514.	-515.	-516.	-517.	-518.	-519.	-520.	-521.	-522.	-523.	-524.	-525.	-526.	-527.	-528.	-529.	-530.	-531.	-532.	-533.	-534.	-535.	-536.	-537.	-538.	-539.	-540.	-541.	-542.	-543.	-544.	-545.	-546.	-547.	-548.	-549.	-550.	-551.	-552.	-553.	-554.	-555.	-556.	-557.	-558.	-559.	-560.	-561.	-562.	-563.	-564.	-565.	-566.	-567.	-568.	-569.	-570.	-571.	-572.	-573.	-574.	-575.	-576.	-577.	-578.	-579.	-580.	-581.	-582.	-583.	-584.	-585.	-586.	-587.	-588.	-589.	-590.	-591.	-592.	-593.	-594.	-595.	-596.	-597.	-598.	-599.	-600.	-601.	-602.	-603.	-604.	-605.	-606.	-607.	-608.	-609.	-610.	-611.	-612.	-613.	-614.	-615.	-616.	-617.	-618.	-619.	-620.	-621.	-622.	-623.	-624.	-625.	-626.	-627.	-628.	-629.	-630.	-631.	-632.	-633.	-634.	-635.	-636.	-637.	-638.	-639.	-640.	-641.	-642.	-643.	-644.	-645.	-646.	-647.	-648.	-649.	-650.	-651.	-652.	-653.	-654.	-655.	-656.	-657.	-658.	-659.	-660.	-661.	-662.	-663.	-664.	-665.	-666.	-667.	-668.	-669.	-670.	-671.	-672.	-673.	-674.	-675.	-676.	-677.	-678.	-679.	-680.	-681.	-682.	-683.	-684.	-685.	-686.	-687.	-688.	-689.	-690.	-691.	-692.	-693.	-694.	-695.	-696.	-697.	-698.	-699.	-700.	-701.	-702.	-703.	-704.	-705.	-706.	-707.	-708.	-709.	-710.	-711.	-712.	-713.	-714.	-715.	-716.	-717.	-718.	-719.	-720.	-721.	-722.	-723.	-724.	-725.	-726.	-727.	-728.	-729.	-730.	-731.	-732.	-733.	-734.	-735.	-736.	-737.	-738.	-739.	-740.	-741.	-742.	-743.	-744.	-745.	-746.	-747.	-748.	-749.	-750.	-751.	-752.	-753.	-754.	-755.	-756.	-757.	-758.	-759.	-760.	-761.	-762.	-763.	-764.	-765.	-766.	-767.	-768.	-769.	-770.	-771.	-772.	-773.	-774.	-775.	-776.	-777.	-778.	-779.	-780.	-781.	-782.	-783.	-784.	-785.	-786.	-787.	-788.	-789.	-790.	-791.	-792.	-793.	-794.	-795.	-796.	-797.	-798.	-799.	-800.	-801.	-802.	-803.	-804.	-805.	-806.	-807.	-808.	-809.	-810.	-811.	-812.	-813.	-814.	-815.	-816.	-817.	-818.	-819.	-820.	-821.	-822.	-823.	-824.	-825.	-826.	-827.	-828.	-829.	-830.	-831.	-832.	-833.	-834.	-835.	-836.	-837.	-838.	-839.	-840.	-841.	-842.	-843.	-844.	-845.	-846.	-847.	-848.	-849.	-850.	-851.	-852.	-853.	-854.	-855.	-856.	-857.	-858.	-859.	-860.	-861.	-862.	-863.	-864.	-865.	-866.	-867.	-868.	-869.	-870.	-871.	-872.	-873.	-874.	-875.	-876.	-877.	-878.	-879.	-880.	-881.	-882.	-883.	-884.	-885.	-886.	-887.	-888.	-889.	-890.	-891.	-892.	-893.	-894.	-895.	-896.	-897.	-898.	-899.	-900.	-901.	-902.	-903.	-904.	-905.	-906.	-907.	-908.	-909.	-910.	-911.	-912.	-913.	-914.	-915.	-916.	-917.	-918.	-919.	-920.	-921.	-922.	-923.	-924.	-925.	-926.	-927.	-928.	-929.	-930.	-931.	-932.	-933.	-934.	-935.	-936.	-937.	-938.	-939.	-940.	-941.	-942.	-943.	-944.	-945.	-946.	-947.	-948.	-949.	-950.	-951.	-952.	-953.	-954.	-955.	-956.	-957.	-958.	-959.	-960.	-961.	-962.	-963.	-964.	-965.	-966.	-967.	-968.	-969.	-970.	-971.	-972.	-973.	-974.	-975.	-976.	-977.	-978.	-979.	-980.	-981.	-982.	-983.	-984.	-985.	-986.	-987.	-988.	-989.	-990.	-991.	-992.	-993.	-994.	-995.	-996.	-997.	-998.	-999.	-1000.	-1001.	-1002.	-1003.	-1004.	-1005.	-1006.	-1007.	-1008.	-1009.	-1010.	-1011.	-1012.	-1013.	-1014.	-1015.	-1016.	-1017.	-1018.	-1019.	-1020.	-1021.	-1022.	-1023.	-1024.	-1025.	-1026.	-1027.	-1028.	-1029.	-1030.	-1031.	-1032.	-1033.	-1034.	-1035.	-1036.	-1037.	-1038.	-1039.	-1040.	-1041.	-1042.	-1043.	-1044.	-1045.	-1046.	-1047.	-1048.	-1049.	-1050.	-1051.	-1052.	-1053.	-1054.	-1055.	-1056.	-1057.	-1058.	-1059.	-1060.	-1061.	-1062.	-1063.	-1064.	-1065.	-1066.	-1067.	-1068.	-1069.	-1070.	-1071.	-1072.	-1073.	-1074.	-1075.	-1076.	-1077.	-1078.	-1079.	-1080.	-1081.	-1082.	-1083.	-1084.	-1085.	-1086.	-1087.	-1088.	-1089.	-1090.	-1091.	-1092.	-1093.	-1094.	-1095.	-1096.	-1097.	-1098.	-1099.	-1100.	-1101.	-1102.	-1103.	-1104.	-1105.	-1106.	-1107.	-1108.	-1109.	-1110.	-1111.	-1112.	-1113.	-1114.	-1115.	-1116.	-1117.	-1118.	-1119.	-1120.	-1121.	-1122.	-1123.	-1124.	-1125.	-1126.	-1127.	-1128.	-1129.	-1130.	-1131.	-1132.	-1133.	-1134.	-1135.	-1136.	-1137.	-1138.	-1139.	-1140.	-1141.	-1142.	-1143.	-1144.	-1145.	-1146.	-1147.	-114

THUNDERSTORMS-PHENOLOGICAL OBSERVATIONS, NOVA SCOTIA, 1903.

The indices indicate the number of stations from which the Thunderstorms were reported on the day of the year specified.

OBSERVATION STATIONS.

[illegible]

THUNDERSTORMS-PHENOLOGICAL OBSERVATIONS, NOVA SCOTIA, 1902

The indices indicate the number of stations from which the Thunderstorms were reported on the day of the year specified.

OBSERVATION STATIONS

1. Yarmouth and Digby.	2. Shelburne, Queens and Lunenburg.	3. Annapolis and Kings.	4. Hants and South Colchester.	5. Halifax and Guysboro.	6. S. Cobequid Slope (S. Cuni. & Co.).	7. North Cuni. Col. Pictou & Antigonish.	8. Richmond and Cape Breton.	9. Bras (1/2r Slope (Int. & V. Cuni.).	10. Inverness Slope to Gulf.	Province of Nova Scotia.
182 ¹ 183 ²	183 ³	183 ⁴	183 ⁵ 184	182 183 ⁶		183 ⁷ 184 185 187 188 189 190 191	182 183 ⁸		183 ⁹	182 ¹⁰ 183 ¹¹ 184 185 187 187 ¹² 188 ¹³ 189 190 191 192
198	198 ¹⁴ 203					198 202				198 ¹⁵ 199 200 201 202
209		204 209				205				203 204 205 206 207
215	216 217 218	216				216 ¹⁶ 218 219 220 ¹⁷ 221 ¹⁸		215		213 213 ¹⁹ 215 ²⁰ 217 218 ²¹
220 221		230				225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000				

FLOWERING AND OTHER PHENOCHRONS FOR THE PROVINCE OF NOVA SCOTIA

SOCIÉTÉ ROYALE DU CANADA

MÉMOIRES

SECTION I.

LITTÉRATURE FRANÇAISE. HISTOIRE, ARCHÉOLOGIE, Etc

ANNÉE 1904

I.—*L'honorable Joseph Royal—Sa vie—Ses œuvres,*

Par M. le juge L. A. PRUDHOMME.

(Lu le 22 juin 1904.)

Un auteur a dit quelque part, qu'il faut se défier surtout de deux classes de personnes: de ses ennemis et de ses amis, parce que les premiers sont généralement injustes ou pour le moins, d'une sévérité outrée, tandis que les seconds, entraînés inconsciemment par une indulgence extrême, versent facilement dans le défaut contraire. Il est évident que je ne compte, au sein de cette société, qui représente l'élite intellectuelle du pays, que des amis, dont l'excessive et trop flatteuse sympathie m'a valu l'honneur d'être associé à vos travaux académiques et d'occuper le fauteuil d'un homme avec lequel mon existence a été intimement liée.

Au surplus, ce touchant témoignage de bienveillance, je le conçois, s'adresse au groupe de vos compatriotes du Nord-Ouest et c'est en leur nom que je vous prie d'accepter l'expression de ma plus cordiale gratitude.

Vous ne pouviez m'inviter à parler de quelqu'un dont le souvenir me fut plus cher et plus précieux à plus d'un titre. Aussi ce sera un devoir bien agréable pour moi de pouvoir rendre à sa mémoire le juste tribut d'hommage et d'affection sincère que je lui porte.

En prolongeant son éloge, je ne ferai, je le sais, qu'augmenter vos regrets de l'avoir sitôt perdu, tout en vous faisant éprouver davantage ma propre infirmité.

L'honorable M. Royal a été mêlé à bien des événements importants de notre histoire et en déroulant devant vous les diverses phases de sa carrière, toute consacrée au service de son pays, j'aurai occasion d'indiquer brièvement le milieu dans lequel il a été appelé à faire sentir son action bienfaisante et la direction qu'il a donnée à l'élément Français de Manitoba, dans les situations troublantes qui signalèrent le berceau du régime constitutionnel, à la Rivière Rouge. Afin de mettre en pleine lumière cette figure si loyale et si éminente et mieux faire saisir les traits saillants de son caractère, il importe de mettre en relief le théâtre sur lequel il a déployé les hautes facultés de son intelligence et les nobles sentiments de son cœur si Français et si catholique.

La vie de M. Royal se divise en trois parties bien distinctes. La première comprend ses premières armes dans le journalisme, alors que la Divine Providence le préparait à son insu, par l'étude et le travail.

à jeter les assises des institutions et des lois d'une nouvelle province.

Lorsque ses heureuses dispositions eurent reçu leur plein développement dans les âpres luttes de la presse, à la demande de Mgr Taché, il prit la route de l'ouest, et pendant 23 ans, il demeura l'un des acteurs les plus en vue, dans les événements passionnants dont ce pays fut témoin, aux heures laborieuses de sa formation.

Au milieu de l'agitation fébrile et des clameurs de cette époque tourmentée, il contribua puissamment par son énergie, la noblesse de ses procédés et un harmonieux ensemble de brillantes qualités, à faire naître un ère de paix et de bonne entente et à grouper les hommes de bien autour du drapeau de la justice et de la légalité.

Ce fut la période la plus féconde de sa vie, en œuvres durables, et celle qui également porte le plus l'empreinte de sa personnalité.

En dépit des occupations absorbantes de la politique, il ne voulut jamais abandonner sa plume si souple et si piquante de sel gaulois.

Sacré écrivain dès sa sortie du collège, il demeura fidèle au secret entraînement de sa vocation. Enfin, lorsqu'il eut épuisé les honneurs de son pays, il quitta l'ouest comme un ouvrier qui, après s'être consciencieusement acquitté de sa tâche tout le jour, retourne le soir à son foyer.

Ce fut la dernière phase de sa vie.

Il entra alors de nouveau dans l'arène du journalisme, qui avait fait le charme de ses premières années. La mort vint le surprendre au milieu de travaux historiques, dont il ne lui restait plus que quelques pages à écrire.

Avant de pénétrer dans le détail de sa vie et d'étudier ses principaux travaux littéraires, je crois qu'il est désirable de donner une idée d'ensemble de cette belle figure et d'en buriner les traits les plus frappants.

M. Royal appartenait à cette race de gentilhommes aux manières chevaleresques que chantaient naguères les trouvères du moyen-âge.

Tout respirait en lui un cachet de noblesse et de grandeur. Sa démarche patricienne, le fin sourire qui se promenait sur ses lèvres, son front altier et découvert, son œil caressant, ainsi que sa politesse exquise attiraient naturellement vers lui et répandaient un charme sur son commerce.

Il n'y avait rien de trivial ou de mesquin dans sa conversation ou sa conduite.

On peut dire que pendant son séjour à la Rivière Rouge, aucun Canadien-français un peu marquant ne passait à St-Boniface sans aller lui rendre visite et il le trouvait toujours prêt à se mettre à sa disposi-

tion pour l'aider à ouvrir les avenues de la nouvelle carrière qu'il venait embrasser au Manitoba. Pour être utile à un compatriote, il lui semblait que ni les pas ni les démarches ni les correspondances étaient un fardeau ou un ennui.

De fait, à certains moments de sa carrière, on finit par abuser de cette extrême condescendance et la faire dégénérer en véritable imposition.

Pourtant, il ne s'en plaignait que rarement. "Que voulez-vous que je fasse, se contentait-il de dire en souriant, ils s'adressent à moi, ils n'ont ici ni parents ni amis; je ne puis pas les repousser."

Dans l'intimité des conversations du foyer, entouré du cercle des confidents de ses pensées, M. Royal était un causeur ravissant.

Il imprimait à ces entretiens familiers un cachet séduisant par la sûreté de ses appréciations sur les événements du jour, les questions historiques ou d'économie politique.

Son commerce constituait une école de bon ton et de délicatesse entre gens bien nés.

M. Royal était un puriste, respectueux de la langue française, qui n'avait pas de secrets pour lui. Sa phrase impeccable et élégante avait toujours le mot juste, le terme *ad hoc*. Il observait dans sa conversation, comme pour sa toilette, une tenue irréprochable. Cette correction de bon goût, qui excluait toute ostentation, provenait naturellement de son amour de l'ordre et des soucis des convenances. Bref, c'était un homme supérieur, qui, même en se répandant avec ses amis, relevait le niveau de la discussion par des considérations d'un ordre élevé et conservait toujours le sentiment de sa dignité. On pourrait à bon droit lui appliquer ce vers du poète latin: "*Odi profanum vulgus atque arceo.*"

Déférent pour les opinions des autres et doué d'une verve intarissable, il était un véritable bout en train qui animait le cercle qui avait la bonne fortune de le posséder. Sa grande affabilité n'allait point toutefois jusqu'à l'abandon, excepté avec ceux qu'il avait pratiqués. Il ne se livrait sans réserve qu'à bon escient. A l'occasion, sur un ton badin et original, il faisait toucher du doigt un défaut, soulignait un travers vulgarisé ou dénonçait un principe boiteux ayant cours. C'était le "*carpere ridendo mores*" du bon Horace. Comme écrivain, M. Royal possédait un style personnel, qui est le propre des hommes d'une grande valeur. Sa phrase était courte, alerte, incisive, courant droit au but, et son expression juste et appropriée, avec une pointe d'esprit très fine et très souple.

C'était un écrivain de race, élégant et nourri de connaissances classiques.

Doué d'une faconde peu commune, c'est presque en se jouant qu'il laissait échapper de sa plume des articles pleins de vie et de brillantes

conceptions. Il a touché un peu tous les genres, moins peut-être le descriptif, qui ne lui offrait que peu d'attrait. Il possédait merveilleusement le talent

“ d'une voix légère,

“De passer du grave au doux, du plaisant au sévère.”

Il n'était pas de ceux qui triturent un sujet comme un fruit savoureux, dont on veut extraire tous les sucres jusqu'à l'assèchement complet.

Il se contentait le plus souvent d'indiquer, comme en passant, les divers aspects d'une question et les considérations les plus frappantes qu'elle appelle, laissant à l'esprit du lecteur le soin de poursuivre plus loin ce premier anneau d'un argument jusqu'à ses ultimes conclusions ou de deviner le reste.

Ainsi allégi dans sa marche rapide, il entraînait le lecteur à sa suite et lui faisait admirer, à chaque instant, des horizons nouveaux sur lesquels il lançait un jet de lumière.

Il demeurait toujours d'une courtoisie parfaite et respectueux de la personne de ses contradicteurs au milieu des passes d'armes les plus vives.

Il n'a eu dans sa vie que des adversaires, jamais d'ennemis.

- Comme orateur, il jouissait d'une popularité bien méritée. Lorsqu'il s'agissait de discuter un problème complexe, d'aborder une situation tendue, il faisait preuve d'un tact et d'une délicatesse de toucher vraiment étonnante.

Sans être un tribun fougueux, sa parole convaincante et mâle ne manquait pas de chaleur.

Les foules aimaient à entendre en lui un homme instruit, à l'âme haute, sincèrement épris d'amour pour la vérité et la justice et l'acclamaient avec enthousiasme.

M. Royal n'était pas seulement un croyant robuste, mais sa foi virile se traduisait dans la pratique de sa vie. Il était vraiment édifiant de le voir, au milieu des distractions multiples de sa carrière publique, assister pieusement, à tous les matins, à la basse-messe et s'approcher, à tous les mois, de la Sainte-Table, pour se nourrir du pain des forts. A tous les dimanches, il se faisait un devoir de monter à l'orgue pour seconder le maître de chapelle et chanter sa partie au lutrin. Généreux à l'excès, le cœur sur la main, toutes les fois qu'il s'agissait d'une œuvre religieuse ou nationale, honorable dans tous ses rapports, d'une amitié sûre et sans défaillance, M. Royal, pour tout résumer en quelques mots, fut un homme de bien, aussi distingué par les qualités du cœur que par la puissance de sa belle intelligence.

Il naquit dans la paroisse de Repentigny, le 7 mai 1837. Son père, brave ouvrier, gagnait le pain de sa famille par son labeur de chaque jour. Il légua à ses enfants, pour toute richesse, un nom sans tache, l'exemple d'une vie honorable et l'amour du devoir.

La constance dans l'effort qui s'impose au chef de famille et cette lutte quotidienne qu'il lui faut livrer pour assurer une honnête aisance au foyer, tiennent en éveil les énergies de l'ouvrier et du cultivateur et éperonnent sa puissance de vouloir et d'agir.

Ses enfants, en vertu des lois de l'atavisme, ont de grandes chances d'hériter de ces qualités, qui sont la clef du succès. Aussi il ne faut pas s'étonner si la plupart de nos hommes d'état sont sortis des rangs de l'armée des travailleurs.

Les talents incontestables de M. Royal furent bientôt remarqués à l'école de son village. Son père, qui avait l'intuition de l'avenir de son fils, s'il était outillé convenablement, aurait bien aimé lui faire poursuivre un cours classique, mais l'état de sa fortune ne lui permettait pas d'entreprendre une telle tâche, lorsque la divine Providence lui suscita un protecteur, dans la personne du révérend M. Venant Pilon, chanoine titulaire de l'évêché de Montréal.

Ce prêtre distingué se chargea de solder toutes les dépenses de ses années de collège.

M. Royal conserva toute sa vie une profonde gratitude envers M. Pilon. Il aimait à redire l'extrême bonté, les nobles sentiments de son protecteur et les précieux conseils qu'il en avait reçus. A tous les ans, à la fête de saint Venant, il se faisait un devoir de communier à son intention. Notons, en passant, qu'elle est longue la liste de nos hommes distingués qui sont redevables du bienfait de l'éducation au dévouement de quelque membre du clergé.

M. Royal commença son cours au collège de Montréal pour le terminer chez les P.P. Jésuites.

Il se trouva en compagnie d'une pléiade de jeunes gens de talents supérieurs qui devaient faire leur marque plus tard. Parmi ses confrères, il suffira de mentionner les noms de l'hon. H. Mercier, qui devint Premier Ministre de la province de Québec, et l'hon. D. Girouard, juge de la Cour Suprême du Canada.

Ce milieu convenait à cette intelligence d'élite et ses professeurs eurent bientôt fait de reconnaître les exubérantes ressources de son esprit.

Après avoir terminé ses études, il éprouva un moment d'hésitation avant de franchir le seuil de son Alma Mater et se demanda s'il n'était pas appelé à pénétrer dans le sanctuaire.

Rassuré bientôt par son directeur, qui prévoyait tout le bien qu'il accomplirait dans le monde, il se destina au barreau et passa brevet

avec Sir Georges E. Cartier. Cependant, les études légales n'offraient point à son esprit prime-sautier, le champ d'action qui lui était propre. Pour cette plante pleine de sève l'atmosphère d'un bureau d'avocat semblait comme celle d'une serre-chaude où il allait s'atrophier faute d'air.

Un attrait irrésistible l'entraînait dans l'arène du journalisme. Il sentait déjà, comme aurait dit Edmond Rostand, un fourmillement dans sa plume.

D'ailleurs, le salaire des étudiants en droit, à cette époque, n'était que nominal et la bourse de M. Royal criait famine. Dans ces circonstances, il alla frapper à la porte de "La Minerve." On la lui ouvrit toute grande et de ce jour, il fut attaché à la rédaction.

C'était en 1857; il ne venait que d'atteindre ses 20 ans. Depuis cette date, M. Royal fit du journalisme sa carrière de préférence. Ce fut l'amant passionné de sa vie. Entre temps, il allait s'asseoir à sa table d'étudiant pour rédiger une déclaration ou analyser un chapitre de Pothier, juste assez pour ne pas donner une entorse trop forte à la loi du barreau, alors débonnaire, et se préparer d'une manière convenable aux examens voulus.

Il est impossible de servir deux maîtres ou d'atteindre les sommets dans deux carrières qui exigent des études et supposent des aptitudes qui, sans s'exclure absolument, sont dirigées par des voies et embrassent des horizons de nature différente. Les joutes ardentes des journaux militants sur les questions politiques, sociales ou économiques du jour, ne constituent pas précisément une formation pour les débats contradictoires du prétoire, sur l'interprétation d'un article du code ou l'application à un cas donné d'une décision judiciaire. Une seule de ces nobles professions suffit à absorber toutes les facultés de l'homme le mieux doué. Aussi, M. Royal eut-il bientôt fait de fixer son choix. Admis au barreau, après un examen qui lui faisait honneur, il décida de laisser, au moins pour le moment, dormir sa robe d'avocat dans sa serviette, afin de donner plus de liberté à sa plume. "La Minerve" était à cette époque, et elle le fut pendant bien des années, l'organe principal du parti conservateur. Dans les bureaux de ce journal, M. Royal devint en contact avec les hommes d'état qui gouvernaient le pays et eut occasion de connaître leurs pensées sur les problèmes du jour et l'orientation qu'ils désiraient donner aux institutions du pays. Ce fut une école bien profitable pour lui et il fut ainsi, dès sa jeunesse, initié à l'art si difficile de gouverner les hommes.

Il profita du printemps de sa vie, alors que toutes les facultés sont en pleine floraison, pour amasser des trésors de sciences profondes et orner son intelligence de connaissances sérieuses. Il n'était pas de ceux qui s'imaginent que le talent dispense du travail.

Le journalisme est un véritable ministère et celui qui veut s'en rendre digne, doit se résigner à devenir un rude travailleur. Autrement, il risque fort de s'égarer et d'entraîner ses lecteurs dans ses erreurs.

En effet, l'influence d'un journal se fait sentir au milieu des milliers de foyers où il pénètre.

S'il est aux mains d'écrivains honnêtes et éclairés, il sert à infiltrer, à petites doses, dans la société, les notions exactes de ce qui est vrai et juste, à déterminer des mouvements d'opinion publique dans la bonne voie, à montrer du doigt les dangers à éviter, à endiguer les emportements malsains pour les innovations dangereuses et enfin à faire connaître, en toute occurrence, les droits et les devoirs d'un chacun.

Celui qui veut servir efficacement sa patrie, dans cette carrière, doit nécessairement travailler sans trêve à s'instruire, car l'on ne peut donner que ce que l'on a. L'écrivain qui n'étudie pas constamment ne tarde guère à s'assécher et à dépenser le bagage de connaissances déjà acquises. Les rives d'un ruisseau ont beau être parsemées de fleurs et de vert feuillage, si la source qui l'alimente vient à tarir et cesse d'y répandre une onde rafraîchissante, elles finissent bientôt par devenir arides et ne plus rien produire.

Ce n'est pas entre deux lanciers ou deux polka, au milieu de soirées enivrantes et féeriques, que la jeunesse peut se former à l'art de diriger l'opinion publique vers le bien. La vie n'est pas un opéra et à ce commerce les caractères se détendent et s'affadissent. Les notions écourtées, de surface, les aperçus à fleur de peau, un peu sur tout ou sur rien, ne peuvent suffire à un journaliste consciencieux de ses devoirs. Une jeunesse, ainsi dissipée, se trouve sans racine et flotte comme des algues de côté et d'autre. Éprouvant un besoin inquiet d'émotion et d'élan, elle se laisse facilement entraîner à tout ce qui la séduit par un aspect de générosité apparente ou attendrir par des mots sonores et confond parfois les nobles aspirations d'un véritable patriotisme, avec les visées vulgaires d'un ambitieux. Il lui manque le contre-poids de l'expérience et des connaissances approfondies.

M. Royal n'a pu être véritablement utile à son pays, que parce que toute sa vie il ne cessa de se livrer à l'étude. C'est la condition *sine qua non* de tout succès sérieux et durable.

Deux ans après son entrée à "La Minerve," il fonda avec Cyrille Boucher et quelques autres écrivains de marque, un journal appelé "L'Ordre."

Cette feuille, rédigée par des jeunes gens brillants, fit du bruit. Ses directeurs ne se souciaient guère de faire du journalisme payant. On se grisait d'une idée noble, émotionnante, et on la lançait devant la public, toute fraîche éclos.

A "L'Ordre," on ne tenait guère compte des ménagements que comporte un journal de parti. On ne coupait pas les ailes aux conceptions de l'écrivain et on ne muselait pas sa pensée au moment où elle voulait prendre son essor, sous le prétexte que le rendement de la caisse pourrait bien en souffrir.

Ces jeunes gens allaient droit leur chemin, frappant en pleine visière, et de tous côtés.

Nous traversons une phase difficile de notre histoire. Les circonstances malheureuses, dans lesquelles le Haut et le Bas-Canada avaient été unis, avaient donné lieu à d'amères récriminations et soulevé des sentiments d'animosité dont on se souvenait encore dans l'occasion.

Les hommes supérieurs de ces deux provinces, en se rencontrant sur les parquets de la Chambre, purent mieux se connaître et se rendre mutuellement justice. Des alliances se firent entre des groupes qui représentaient ces deux provinces, mais ces unions qui ne dataient que depuis peu, n'avaient pas encore été suffisamment cimentées par le temps et l'identité des intérêts, pour offrir une forte résistance. Aussi les ministères, dont l'existence dépendait de ces rapprochements éphémères, étaient emportés par le premier coup de vent que soulevait une faction. Le gouvernement responsable en était à ses premières épreuves et ce n'est pas du premier coup qu'un régime aussi complexe peut avoir toutes ses prises dans un pays. Les rouages si admirables de cette forme de gouvernement donnaient lieu à des frictions dans ses fonctionnements si multiples, comme une machine aux premiers jours d'essai.

"L'Ordre," l'œil au guet, dénonçait, sans merci, tout ce qui lui paraissait défectueux dans cet engrenage et appelait chaque chose par son nom, sans mettre de sourdine à ses opinions.

De fait, M. Royal, par tempérament, entendait bien réclamer, en toute occasion, la liberté de parole et était impatient de toute entrave qui pouvait gêner l'expression franche, sincère et complète du fond de sa pensée.

Cette noble indépendance valut à "L'Ordre" des témoignages de sympathie très flatteurs. Toutefois, ce journal, privé de tout patronage, n'ayant pour capital que le talent de ses directeurs, connut bientôt les ennuis de la gêne financière. Le temps n'était pas favorable à un journal de cette allure et après plusieurs années de joutes brillantes, "L'Ordre" rentra dans le silence ou si l'on aime mieux, le silence entra dans "L'Ordre." M. Royal, qui sentait en lui le feu sacré du journalisme, ne pouvait se passer d'un organe. Peu de temps après la disparition de "L'Ordre," il fondait "Le Nouveau Monde," dont il devint le premier rédacteur en chef. C'était en 1867.

Le Canada était arrivé à une période passionnante, à un point tournant de son histoire.

La confédération des provinces britanniques de l'Amérique du Nord offrait un vaste champ d'étude et soulevait une foule de problèmes.

On se demandait, avec inquiétude, ce qu'allait devenir la race française, avec ses institutions propres et ses immunités religieuses et nationales, dans cette agglomération disparate. Avant que cette forme nouvelle ne fut moulue sur les traits vivants du peuple auquel on l'appliquait, elle faisait naître de vives appréhensions chez bien des hommes, qui d'ailleurs ne lui étaient pas hostiles. C'est qu'il est plus facile de fabriquer une constitution que de façonner les intelligences et de disposer les citoyens à l'accepter avec le même esprit que ses auteurs.

L'homme n'est pas une entité éclos sous une baguette métaphysique.

M. Royal, sincèrement attaché aux intérêts religieux et nationaux de ses compatriotes, tout en saluant avec plaisir ce nouvel ordre de choses, devenu dans les circonstances une quasi-nécessité, ne se livrait pas tout entier à l'enivrement d'une joie sans mélange. Il faisait ses réserves et conseillait une vigilance active sur ce qui pouvait faiblir, dans cette structure à peine édifiée, et devenir une menace pour les éléments de notre nationalité. C'était le "Caveant Consules" qu'il faisait entendre de temps à autre dans son journal, tout en favorisant les hommes alors au pouvoir.

"Le Nouveau Monde," rédigé avec vigueur et talent, fut accueilli avec faveur dans la province de Québec. On y admirait surtout l'orthodoxie de ses principes sur les questions qui concernaient les rapports de l'Eglise avec l'Etat. Il déterminait un courant d'opinions sur les thèses alors en discussion et groupait une phalange considérable d'hommes de valeur autour de son drapeau.

Bref, "Le Nouveau Monde" fit une école, dont M. Royal était l'âme dirigeante. On comprendra que je suis tenu, ici, à des réserves et que je ne puis qu'effleurer du bout de l'aile ces sujets si étrangers aux travaux de notre société.

Un changement se produisit tout à coup dans la carrière de M. Royal et lui fit abandonner "Le Nouveau Monde" pour aller faire sentir son action sur un autre théâtre. Mgr Taché se trouvait à Montréal en 1870, en route pour la Rivière Rouge, pour y exercer un ministère de paix et de conciliation.

Avant son départ, il chercha à s'entourer d'hommes instruits et bien disposés, qui pussent prendre en main les intérêts de l'élément catholique et français dans la province naissante. M. Joseph Dubue, alors jeune avocat, à Montréal, avait déjà pris les devants, à la demande de Mgr J. N. Ritchot.

Mgr Taché invita MM. Girard et Royal à l'accompagner dans l'ouest, et tous deux répondirent sur le champ à son appel.

M. Royal, né au milieu de la tourmente de 1837, fonda le premier journal qui lui fut propre, pendant que l'agitation politique de 1867 battait son plein, et commença une nouvelle carrière, au Manitoba, aux derniers jours du gouvernement provisoire, alors que cette province était en ébullition et menaçait de mettre le feu au reste de la confédération.

Pourtant, par une curieuse ironie du sort, M. Royal était d'un tempérament bien calme. Il ne se laissait pas égarer par l'enthousiasme fascinateur du moment et ces événements fortuits n'exercèrent aucune influence maligne sur son caractère. Disons plutôt, que se possédant lui-même dans la quiétude de ses pensées, il était merveilleusement doué des qualités nécessaires à un homme d'état, appelé à agir dans des situations qui demandent de l'habileté et de la pondération.

Avant de suivre M. Royal dans la deuxième phase de sa vie, je n'ai garde d'oublier la part active qu'il prit dans le recrutement des zouaves pontificaux, que le Canada français, en 1867 et 1868, envoya à Rome au secours de l'immortel Pie IX.

Comme membre du bureau de direction, il ne s'épargna aucun trouble pour assurer le succès de ce mouvement si admirable de la foi des Canadiens-français. Il a publié dans "Le Nouveau Monde," sur cette glorieuse croisade, des pages empoignantes qui eurent du retentissement jusqu'en France. Un souffle d'enthousiasme religieux et de patriotisme chrétien passa sur la province de Québec, presque comme aux jours de Pierre L'Ermite. On vit des jeunes gens appartenant à nos meilleures familles s'arracher des étreintes maternelles pour aller faire au Saint-Père un rempart de leurs poitrines contre les balles gariibaldiennes et offrir généreusement leur sang pour la liberté de l'Eglise. Ce fut un beau spectacle pour l'Europe, que le défilé de ces jeunes bataillons, accourus de si loin, pour protéger la Papauté.

Ce fut alors que M. Royal se lia d'amitié avec le chevalier Taillefer, commandant du premier contingent des Zouaves Canadiens. Il devait le rencontrer plus tard dans le parlement provincial de Manitoba.

M. Royal arriva au fort Garry juste à temps pour assister à la dernière séance du gouvernement provisoire. Le lendemain, Riel avait cessé d'être président et Lord Wolsely entra dans le fort abandonné et prenait en main les rênes du gouvernement, pour les remettre quelques jours après au premier gouverneur de Manitoba, l'hon. A. G. Archibald.

A l'automne 1870 eurent lieu les élections provinciales, et MM. Girard, Royal et Dubuc furent élus députés par acclamation. Ces trois hommes devinrent les figures les plus marquantes de l'élément Français

de Manitoba et les facteurs principaux dans les événements qui suivirent cette période aigüe et troublée de l'histoire de cette province.

Les comparaisons ont toujours un côté pénible et blessant; c'est pourquoi je me garderai bien d'en établir aucune entre ces trois hommes de mérite, qui ont rendu chacun de grands services à la cause Française.

Toutefois, je me bornerai à quelques notes fugitives pour indiquer brièvement les traits saillants de leur caractère respectif.

L'hon. M. Girard, d'un tempérament conciliant et modéré, était entouré du respect et de la considération de toute la population du pays. Son extrême bonté lui faisait éviter, autant que possible, les heurts et les frictions inutiles; mais lorsqu'il se trouvait acculé à ses derniers retranchements, pour la défense des droits des siens, il se raidissait avec une tenacité surprenante et qui déconcertait ses adversaires. Il avait la parole facile, chaude et entraînante.

Dès septembre 1870, le gouverneur Archibald l'appela avec M. Boyd, à devenir son aviseur, et il demeura dans le gouvernement jusqu'au mois de mars 1872, alors qu'il fut remplacé par M. Royal. Nommé sénateur en 1871, il ne put, par la suite, consacrer autant de soins aux affaires provinciales. Lorsqu'une crise éclata en 1874, M. Girard eut l'honneur d'être le premier ministre de Manitoba. Il appela, comme un de ses collègues, M. Dubuc, qui accepta le portefeuille de procureur-général. C'était la première administration régulière dont fut dotée notre province. Avant M. Girard, il n'y avait pas eu de chef de cabinet. Le gouvernement Archibald avait formé son ministère en choisissant lui-même tous ses aviseurs, qui se trouvaient ainsi sur un pied d'égalité et sans premier reconnu. Ce gouvernement ne dura que quelques mois.

En 1879, une autre crise amena de nouveau M. Girard dans le cabinet, qu'il quitta définitivement en 1883. La mort de cet homme de bien, arrivée en septembre 1892, causa à Manitoba un deuil général.

Dès leur arrivée à la Rivière Rouge, MM. Royal et Dubuc se rencontrèrent au palais de Mgr Taché, dont ils étaient les hôtes, et se lièrent d'une amitié qui ne s'est jamais démentie. Ils étaient faits pour se comprendre.

Prototype de l'homme droit, loyal et fidèle comme l'épée du roi, d'une franchise proverbiale et d'une sûreté de jugement peu ordinaire, M. Dubuc fut le digne émule de M. Royal. M. Royal aimait à rendre hommage, le premier, à la noblesse de caractère, à l'élévation de sentiments et aux talents sérieux de celui qui fut, pendant plusieurs années, son Alter Ego.

De fait, comme grandeur morale, l'hon. M. Dubuc a sa place marquée parmi les hommes distingués dont notre race s'honore. Depuis qu'il est sur le banc, il est devenu l'idole du barreau, qui admire en lui le sens inné de la justice et de l'équité et la clarté de ses décisions.

Aussi, la population de l'ouest, sans distinction de nationalité, ni de religion, a-t-elle salué avec satisfaction et applaudi de tout cœur sa récente nomination au poste si honorable de juge en chef pour Manitoba. C'est le premier Canadien-français qui reçoit un tel honneur dans notre province.

MM. Royal et Dubuc formèrent une société légale et pratiquèrent ensemble jusqu'au mois de mai 1876, alors que M. Royal devint procureur-général, tout en conservant, le portefeuille de secrétaire provincial. Ce surcroît de besogne le força à abandonner momentanément la pratique de sa profession, qu'il ne reprit qu'en 1880. Il forma cette année-là une nouvelle société, avec celui qui porte en ce moment la parole, sous le nom de "Royal et Prud'homme." Cette société fut dissoute au mois de juillet 1885, lorsque je fus appelé à monter sur le banc.

M. Royal renonça alors aux études légales pour n'y plus retourner. C'est dans le bureau de MM. Royal et Dubuc que se discutaient toutes les questions qui concernaient l'élément Français de l'ouest. M. Royal, qui ne s'était fait recevoir avocat que comme en tout cas, comme une poire pour la soif, tel qu'il le disait lui-même en souriant, eut occasion, en certaines circonstances graves, de faire son apparition au temple de Thémis et d'être mêlé à des procès retentissants.

De concert avec M. Dubuc, il dirigea, avec un talent remarquable, l'enquête préliminaire d'Ambroise D. Lépine, l'adjudant général de Riel, accusé du meurtre de Scott. Ce fut lui qui, en 1874, fit venir l'hon. M. Chapleau, de la province de Québec, pour plaider cette cause devant les jurés et il se chargea lui-même de l'adresse aux jurés Anglais. Il défendit également André Nault, accusé de participation dans le même crime. Dans ces procès politiques, il s'acquitta du premier coup, la réputation d'avocat habile et fertile en ressources.

Les lauriers dont il se couvrit, dans ces courtes périodes de sa carrière d'avocat, font regretter qu'il n'ait pu y consacrer plus de loisir. Il aurait pu facilement s'y créer une position enviable et surtout plus lucrative que dans celle du journalisme.

Que de requêtes, de mémoires et d'articles de journaux furent rédigés par M. Royal, sur la question de l'amnistie, des droits des anciens colons du pays, de l'émigration, etc. Il faudrait ici écrire un livre pour raconter convenablement les travaux de tous genres qu'il entreprit dans l'intérêt de ses compatriotes. Qu'il me soit permis, au moins, de dire qu'il ne s'est guère épargné et qu'il n'a jamais hésité à payer de sa personne, et souvent de sa bourse, pour la noble cause qui lui était confiée.

Lorsque le premier parlement de Manitoba fut convoqué en 1871, M. Royal fut élu unanimement Orateur. Un fait assez étrange à constater, à ce moment, c'est que pas un seul des députés ne possédait l'ex-

périence de la procédure parlementaire, à l'exception de M. Royal, qui avait assisté autrefois aux débats de l'Assemblée Législative de Québec.

Le 15 mars 1872, il quittait le fauteuil présidentiel pour aller s'asseoir sur les banquettes ministérielles, comme secrétaire provincial. Il résigna en juillet 1874 et, le 3 décembre de la même année, il entra dans le cabinet Davis, comme secrétaire provincial et ministre des travaux publics. Au mois de mai 1876, lorsqu'il devint procureur général, comme j'ai déjà eu occasion de le dire, il abandonna la direction du département des travaux publics, mais conserva le portefeuille de secrétaire provincial.

De 1872 à 1879, sauf une interruption de cinq mois, il demeura ministre, et je pourrais dire le chef virtuel du gouvernement par l'ascendant que lui donnait sa supériorité intellectuelle. Les députés Anglais se plaisaient à reconnaître ses talents d'administration et la fertilité de ses ressources dans les situations qui demandaient du tact et du savoir-faire.

Entreprendre de législater sur du neuf et de créer tout d'une venue les rouages si compliqués d'un gouvernement, dans un pays qui sortait d'une tourmente, était une tentative peu commode et qui exigeait des talents bien équilibrés.

Une fausse manœuvre eut suffi pour soulever des haines encore mal éteintes et créer une panique. Dans une province, qui a joui depuis quelque temps des bienfaits du régime constitutionnel, on trouve des traditions qui ont donné le pli à l'opinion publique et qui surnagent au milieu des colères que déchainent tout à coup des questions brûlantes. Les lois tiennent par des racines profondes, implantées dans le tempérament et les mœurs du peuple.

Mais à Manitoba, il fallait travailler sur une table rase, calculer juste avec des quantités imparfaitement connues, au milieu d'éléments disparates, d'une civilisation de première poussée et du relâchement des freins réguliers qui maintiennent d'ordinaire une société. Les libertés constitutionnelles ne sont pas un aliment que tous les estomacs peuvent digérer sans préparation. Or, cette province, toujours à la veille d'une émeute, avait besoin d'être guidée par des hommes supérieurs, capables de ménager cette transition et de faire accepter par l'opinion publique ce nouvel ordre de choses.

Ce fut le grand mérite de M. Royal de s'être acquitté de cette tâche si difficile, dans des circonstances exceptionnelles. Il s'est acquis par là un droit à la gratitude de ses concitoyens. Une étude de la législation qu'il fit adopter m'amènerait trop loin et prolongerait ce discours au delà des bornes convenables. Je mentionnerai, cependant, la loi universitaire dont il est l'auteur. Il en fut récompensé par le conseil de cette institution, qui le choisit pour vice-chancelier. Il présenta également

la première loi scolaire, et devint le premier surintendant d'éducation. Il fut chargé, plus tard, de la refonte des statuts provinciaux, avec le juge en chef Wood.

Il prit une part importante à l'abolition du conseil législatif, qui n'était d'aucune utilité. On avait cru, tout d'abord, que ce corps pourrait protéger la minorité et la mettre à l'abri d'actes agressifs de la part de la Chambre populaire.

Cette espérance était purement illusoire. Pour être effectif, le conseil, qui ne se composait que de sept membres, aurait dû indubitablement être augmenté. La constitution y pourvoyait d'ailleurs. L'élément Français, par suite de l'émigration Anglaise, se serait trouvé amoindri au conseil et obligé de compter sur le bon vouloir de deux Chambres au lieu d'une. En 1879, l'hon. M. Dubuc, qui représentait le comté de Provencher aux Communes, fut nommé juge et l'hon. M. Royal lui succéda.

Les électeurs de Provencher lui demeurèrent fidèles jusqu'à ce qu'il fut nommé lieutenant-gouverneur des Territoires du Nord-Ouest. Il fit bonne figure au Parlement Fédéral et soutint la réputation qui l'y avait précédé. Il était considéré comme une autorité sur les choses de l'ouest.

Ses discours d'un style châtié et d'une diction attrayante ne manquaient jamais d'éveiller l'attention publique.

C'est en 1888 qu'il fut appelé au poste de lieutenant-gouverneur. Trois ans avant, Lord Lansdowne lui avait conféré la médaille de la confédération.

C'était le couronnement de sa carrière et la récompense de ses états de service.

Quelque soit l'opinion que l'on puisse entretenir sur les actes de sa vie publique, on ne refusera pas à sa mémoire le témoignage d'avoir été un homme de bien, dévoué aux intérêts religieux et nationaux de ses compatriotes de l'ouest et utile à son pays.

A l'expiration de son terme d'office, il quitta l'ouest, auquel il avait consacré les plus belles années de sa vie, et retourna à Montréal. La même année (1893) il remplaça son ami de cœur, l'hon. sénateur Tassé, à la rédaction de "La Minerve." Comme presque tous nos hommes d'état, M. Royal n'était pas riche. Les dures nécessités de la vie l'obligèrent à reprendre sa plume et à entrer de nouveau dans le journalisme.

En 1894, la Société Royale du Canada lui offrit un siège dans son sein et fut heureuse d'inscrire parmi ses membres cet écrivain de marque.

Au soir de sa carrière, il se recueillit un instant et entreprit une histoire du Canada, comprenant la période écoulée depuis la confédération. La mort l'atteignit lorsqu'il achevait de mettre la dernière main à ce travail de longue haleine. Il s'endormit doucement, entouré des

consolations de l'Eglise, qu'il avait tant aimée, de l'affection de ses proches et des regrets de tous ceux qui l'avaient connu.

Pendant qu'il était au Manitoba, il avait fondé, en 1871, "Le Métis," auquel collabora M. Dubuc pendant trois ans d'une manière très active.

En 1882, "Le Manitoba" succéda au "Métis." A part la valeur littéraire de ce journal, "Le Métis" était un registre précieux, dans lequel étaient consignés les événements importants de cette époque.

Il constitue un document d'une valeur inappréciable sur les commencements de notre province.

M. Royal fut à plusieurs reprises élu président de la société St-Jean-Baptiste de St-Boniface qui, pendant longtemps, était la seule organisation de ce genre dans tout le Nord-Ouest. L'union fraternelle, qui se cimente par les sacrifices d'opinion personnelle pour le bien général, cette union féconde qui centuple les forces vitales d'une nationalité, était le thème constant de ses discours du 24 juin. Mais il voulait cette union dans la conservation de nos traditions d'honneur, de respect mutuel et d'aspirations vers le bien, dans la culture des heureuses dispositions de notre caractère et surtout dans une étroite alliance avec le clergé. Il voulait qu'on fit large la part d'influence de ce dernier, parce qu'elle tend toujours à la grandeur de notre race. Aussi pour lui, Canadien-français et catholique, étaient tout un. Il ne pouvait comprendre qu'on put considérer encore comme un frère celui qui avait eu le malheur d'abandonner sa foi. En effet, le Canadien-français qui renie ses croyances religieuses, devient méconnaissable aux yeux de ses compatriotes. Il sort de nos rangs et rompt avec tout un passé historique, sur un point essentiel et caractéristique.

On ne se scinde pas en gardant la langue et rejetant la foi. Une opération de ce genre est nécessairement fatale. Aussi, remarque-t-on que ceux des nôtres qui ont cessé d'être catholiques, finissent bientôt par faire bande à part, quand ils ne vont pas grossir les rangs d'une autre nationalité. Ne recevant plus la sève religieuse du tronc national, ils s'étiolent, tombent comme une branche desséchée, pour aller retiger ensuite sur une autre souche.

Il serait étonnant qu'il en fut autrement, car le catholicisme a imprimé à notre âme une empreinte indélébile. Nous lui appartenons par toutes les fibres de notre être. On le retrouve à notre berceau et intimement lié ensuite à toutes nos institutions. En éliminant cet élément qui fait partie de notre vie, on devient un hors d'œuvre, un reproche constant au reste du groupe national et une entithèse qui se redresse constamment comme un protêt de déchéance.

Dans les heures de loisir que lui donnait le journalisme, M. Royal fonda, avec d'autres écrivains distingués, "La Revue Canadienne," qui

est demeurée depuis l'un des recueils de littérature canadienne le plus prisé dans la province de Québec. Elle a rendu à notre nationalité des services considérables et est conservée religieusement dans les bibliothèques assez heureuses pour en posséder toutes les livraisons.

Elle célébrera cette année le 40^e anniversaire de sa naissance. C'est déjà un âge bien respectable en Canada et qui la constitue la doyenne des publications de ce genre.

Elle a vu bien des compagnes, écloses à ses côtés, toutes palpitantes d'espérance, lui fausser compagnie, après quelques années d'existence, faute d'encouragement.

"La Revue Canadienne" a connu, elle aussi, ses heures d'angoisse et de difficultés pécuniaires. Elle a pu heureusement les traverser et aujourd'hui elle semble s'être plongée dans l'eau de Jouvence et avoir acquis un regain de vigueur, sous la direction intelligente qu'elle reçoit et qui lui promet de voir encore de nombreux printemps.

"La Revue" fut fondée en 1864. M. N. Bourassa fut choisi pour être le président du bureau de direction et M. Royal le secrétaire-gérant avec J. A. N. Provencher comme assistant. Parmi les collaborateurs, outre ces deux derniers noms, nous trouvons ceux de deux autres écrivains qui ont laissé un souvenir précieux dans le Nord-Ouest: ce sont Mgr Lafèche, compagnon de Mgr Taché, à l'Île à la Crosse, et le P. Aubert, O.M.I., qui, en 1845, fit avec Mgr Taché le voyage à la Rivière Rouge.

M. Royal débuta, dans cette nouvelle publication, par une étude sur le traité de réciprocité de 1854, qui allait expirer. Cet article plein de verve et documenté, était un plaidoyer habile en faveur de la continuation du traité. Il conseillait, s'il devait être abrogé, de chercher des marchés à nos productions dans la Grande Bretagne et sur le continent Européen. "La politique de ce pays, disait-il, doit avoir un but noble, élevé, d'émancipation et d'indépendance; tous nos actes importants doivent s'imprégner de ce souffle fécond et respirer comme un parfum d'avenir." Ces quelques lignes faisaient déjà prévoir l'auteur de "République ou Colonie." Ce premier effort fut bientôt suivi par une étude sur la vie de Sir Louis Hippolyte Lafontaine. Ce travail magistral est l'œuvre par excellence de M. Royal et la pièce de résistance de tous ses écrits. Il mériterait d'être imprimé en brochure et distribué dans nos collèges pour l'instruction de la jeunesse. C'est un tableau rapide mais complet d'une des parties de notre histoire la plus difficile à apprécier. M. Royal s'est réellement surpassé dans ces pages inspirées, qui s'élèvent par le style, la chaleur, le souffle patriotique et la fidélité des traits, à la hauteur de Garneau, notre historien national. Comme il nous fait bien sentir, avec toutes ses nuances, les courants d'opinion qui agitaient les divers groupes politiques, et connaître l'or-

ganisation et les tendances de chacun d'eux, le travail de formation et de dissolution des partis qui se disputaient le pouvoir et émergeant au-dessus de l'arène où ces éléments en fermentation se combattent, il nous montre la noble figure de Lafontaine qui se dresse, domine la situation et arrache des mains de ses adversaires nos libertés constitutionnelles.

Je ne puis mieux donner une idée de ces belles pages que par une citation qui résume presque toute la vie de Lafontaine.

“La plus grande gloire de ce grand homme, dit-il, sera d'avoir combattu pour la liberté de son pays, avec les armes dont on voulait la frapper, et d'avoir assis son triomphe sur l'état social où ses ennemis s'étaient flattés de la faire disparaître pour toujours.”

M. Royal met en pleine lumière les hommes du jour qui furent les compagnons d'arme de Lafontaine. D'un coup de pinceau finement tracé, il burine les traits de Baldwin, Draper, Sir Allan McNab, etc. Lorsque se présente la figure de ce grand patriote qui eut nom D. B. Viger, l'auteur se trouble, hésite, se sent évidemment mal à l'aise dans ses appréciations et finit par suspendre son jugement. Il laisse néanmoins trahir un peu sa pensée dans la complaisance avec laquelle il met sous les yeux du lecteur les motifs patriotiques qui ont pu déterminer les actes de ce vieux patriarche de nos luttes politiques. Ces quelques lignes sont d'un intérêt très piquant, car il est fort probable qu'elles expriment la pensée de l'hon. D. B. Viger. Il ne faut pas oublier, en effet, que M. Royal avait été, pendant quelque temps, son secrétaire privé, et que plus d'une fois ce noble vieillard a dû l'entretenir sur cette phase de sa carrière où il lui semblait que ses compatriotes s'étaient mépris sur ses intentions.

C'est un soulagement pour les Canadiens-français de savoir que si D. B. Viger a pu, à un moment donné, manquer de justesse et de sagacité dans ses appréciations sur le nouvel ordre de choses et les obligations qu'il comportait, ni l'éblouissement du pouvoir, ni des motifs d'avancement personnel n'ont effleuré ce cœur dévoué aux intérêts des siens.

D'ailleurs, ceux qui ont longtemps souffert sous un régime néfaste, sont portés naturellement à s'exagérer les dangers d'un recul à ce passé encore tout vivace dans leur souvenir. Comme le laisse entendre M. Royal, l'hon. M. Viger a pu croire à une fausse manœuvre de Lafontaine et craindre qu'en exigeant sitôt le plein exercice des nouvelles libertés, il s'exposait à perdre ces libertés-là même.

C'est dans des études de cette nature, sur des sujets complexes, que M. Royal se trouvait dans le milieu qui lui convenait davantage et pouvait mieux donner la pleine mesure de ses talents. La structure de son esprit synthétique s'accommodait à ces situations embrouillées, tendues et périlleuses. Son œil exercé, scrute rapidement l'origine et la

cause des événements, à mesure qu'ils se produisent et sait distinguer non seulement les différences, mais même les teintes éphémères d'opinions entre les hommes marquants du jour.

C'est le champ qu'il a exploité avec le plus de succès et où il semble se mouvoir le plus à son aise.

L'année suivante, il publiait dans "La Revue Canadienne" une étude sur un sujet similaire, intitulée: "Considérations sur les nouveaux changements constitutionnels de l'Amérique Britannique du Nord."

Il cherche à démontrer dans cet ouvrage que le système fédératif est la condition la plus logique et l'acheminement le plus naturel des diverses possessions Anglo-Américaines. Il commence par poser comme base de sa thèse, qu'il ne se présentait pour les colonies que trois moyens de se constituer, politiquement, en dehors de leur existence actuelle.

Ces trois moyens étaient leur érection en plusieurs souverainetés indépendantes, leur annexion aux Etats-Unis et enfin leur union sous un même gouvernement central. C'est à ce dernier moyen qu'il s'arrête, comme étant le seul qui put assurer d'une manière solide et permanente la prospérité matérielle, l'indépendance, la grandeur et la libre et naturelle expansion de chacune de ces provinces. Pour appuyer cette opinion, il énumère l'étendue et les ressources de l'Amérique anglaise et démontre la solidarité d'intérêts qui existe entre ces diverses colonies isolées. Il passe en revue les richesses agricoles et manufacturières de chacune d'elles, le développement de leur industrie et de leur exportation et l'importance d'une union douanière.

Après avoir indiqué les avantages mutuels qui résulteraient de la confédération, l'auteur étudie les conditions dans lesquelles cet événement doit se produire. Il se demande ce que deviendront nos institutions religieuses et nationales sous le régime fédéral et il en conclut qu'elles auront plus d'avenir et de chance de s'étendre et de se fortifier sous cette forme de gouvernement que sous aucune autre. Il insiste aussi sur les garanties sérieuses que ce pacte devra consacrer en faveur de l'élément Français et catholique. Dans la dernière partie de ce travail, il combat l'annexion et en démontre les dangers.

Dans cette étude, M. Royal fait œuvre d'un penseur possédant des connaissances considérables sur la philosophie de l'histoire.

Plusieurs de ses considérations seraient encore aujourd'hui d'une actualité frappante.

* Si nous laissons de côté les écrits de M. Royal, qui touchent de près les choses de la politique, nous avons sous les yeux un joli morceau de littérature qui a pour titre: "Le sacrifice et l'égoïsme." Cette étude porte l'empreinte de sa mentalité. On ne sait trop quoi le plus admirer, ou de la fécondité des conceptions, de la fraîcheur des peintures, de la

richesse des couleurs, ou de la splendeur du jet. Sous un style nerveux qui drape des pensées originales et d'une grande justesse, il nous montre l'égoïsme triomphant chez les peuples anciens, l'individu déifié dans tout, jusque dans les tendances les plus abjectes de sa nature et la loi du plus fort, courbant le monde sous sa verge abrutissante. Il fait voir ensuite l'œuvre réparatrice du christianisme, qui jette dans ce monde perdu le principe généreux du sacrifice au moyen duquel la société se reconstitue. Après un exposé nettement tracé des ravages de l'égoïsme et des bienfaits du sacrifice, il descend dans les détails de la vie et dénonce les menées de l'ambitieux, de l'avare, du jaloux et du mesquin. La partie dans laquelle il établit le parallèle entre le fonctionnement et les résultats matériels et moraux, des institutions de charité organisées par l'état et maintenues par des taxes spéciales et ceux dus à l'initiative des particuliers et à la pratique des préceptes de l'évangile, est d'une envolée superbe.

Laissez-moi citer un des délicieux passages qu'on y rencontre.

“ Toutes les plus belles phrases des économistes, dit-il, ont-elles été capables de nous donner une seule de nos sœurs de charité? Tout l'or de l'état pourrait-il former un seul St-Vincent de Paul? Pour-quoi ce contraste; pourquoi d'un côté, la vie, le succès, le soulagement à la fois de l'âme et du corps et de l'autre les résultats douteux et rien qui adoucisse la flétrissure de l'assistance. C'est que dans le premier cas l'idée de sacrifice et la pratique d'une vertu sont le mobile de l'acte, tandis que le second ne s'attache qu'à faire disparaître l'effet physique et tout matériel de la pauvreté, sans chercher à amoindrir la cause morale, qui est l'égoïsme. C'est ainsi que se trouve prouvé, une fois de plus, l'accord éclatant des doctrines du christianisme avec les saines notions de la science humaine et la communauté des principes de l'économie politique avec les préceptes de la morale évangélique.”

Jusqu'en 1867, il publia, dans chaque livraison de “ La Revue,” une chronique des événements du mois et des notices bibliographiques, afin de tenir les lecteurs au courant des nouvelles importantes et du mouvement littéraire.

Dans un style châtié et sobre, qui se replie sur lui-même pour être plus concis, il s'acquittait de cette tâche ingraté avec un rare bonheur. Quelquefois il s'échappait et prenait son essor. Alors, la chronique dégénérait en véritable conférence qui couvrait plusieurs colonnes de “ La Revue.” Le rédacteur du “ Nouveau Monde ” avait, dans certaines circonstances, grand mal à entrer dans les habits trop étroits d'un chroniqueur. On pourra s'en convaincre en feuilletant les pages de “ La Revue ” de 1865.

En 1868, M. Royal, qui commençait un peu à négliger les travaux de longue haleine, donna devant "L'Union Catholique de St-Hyacinthe" une conférence sur "Le Naturalisme de Benjamin Franklin." Il n'est pas tendre, dans cet écrit, sur les principes constitutifs de la société américaine.

Il montre Franklin, un des pères de cette puissante république, marchant sur les traces des anciens philosophes païens, tels que Socrate, Platon et Aristote, et faisant faire un recul de deux mille ans à cette nation, en la jetant dans les formes vermoulues du Naturalisme antique et la dirigeant hors des voies du christianisme. Il fait toucher du doigt les ruines morales dont cette jeune société souffrait déjà, presque à son berceau, pour avoir rejeté les vérités vivifiantes de l'évangile. Il montre Franklin faisant table rase de la révélation, pour ramener les hommes de sa république aux notions pures et simples de la religion naturelle. Cette étude fort documentée est tout à lire. Je citerai du moins ses conclusions.

"La conclusion que nous pourrions déduire, dit-il, du sujet que nous avons examiné et dont nous n'avons indiqué que les principaux traits, pourrait se formuler ainsi, d'une manière générale:

"1. La sagesse purement rationnelle est impuissante à contenir les passions de l'homme déchu.

"2. Le renoncement est la condition première de toute civilisation.

"3. Le sensualisme, ou plutôt la doctrine utilitaire, est impuissante à assurer aux sociétés le progrès régulier et constant de la population et ce résultat est l'œuvre exclusive des doctrines et des institutions de l'Eglise catholique."

J'ai parlé de "L'Union Catholique de St-Hyacinthe." Une société du même genre avait été organisée à Montréal par les PP. Jésuites. M. Royal en devint le président. En 1866, il y prononça un discours sur "Le Goût," qui fut très remarqué. Je n'en citerai qu'une phrase

"Si nous ne voulons pas nous écarter, dit-il, de la route du beau et faire preuve de goût, veillons à ce que cette précieuse harmonie des cœurs et de l'esprit, du fond de la forme, cette alliance du sentiment qui remue et de la raison qui persuade, soit sans cesse le but de nos efforts."

Ces quelques lignes résument les développements qui précèdent et en sont comme la quintessence.

La période de la vie de M. Royal où il produisit le plus d'œuvres littéraires couvre les années de 1864 à 1870. Il semblait alors inépuisable et toujours en veine.

Ses écrits respirent tous une grande fraîcheur de style et de pensées et portent l'empreinte d'un esprit fin et cultivé. Après son départ pour la Rivière Rouge, les soucis de la politique ne lui donnèrent guère

de loisir, et ce n'est qu'à de rares intervalles qu'il put se livrer à ses travaux favoris.

Dans sa retraite, à Régina, il retrouva sa liberté et en profita pour publier quelques bluettes, toutes pétillantes d'esprit et ciselées avec art. En les parcourant, ses amis se disaient les uns aux autres, qu'évidemment la plume de M. Royal n'avait pas vieilli.

Son "Capitaine Maillé," par exemple, pour ne parler que de celle-là, faisait les délices de nos littérateurs. Ces productions fugitives, écloses comme en se jouant, n'étaient qu'une préparation à un ouvrage plus sérieux.

"République ou Colonie," publié en 1894, a été, je dois l'avouer, le sujet de vives critiques et je ne viens pas, assurément, ouvrir ici un débat intempestif.

Si je ne me trompe, toutefois, je crois que la pensée dominante de cette brochure n'était pas tant de trouver, comme semblait l'indiquer le titre, le mot ultime de notre avenir politique, que d'éveiller l'opinion publique sur ce grave problème et de lever un coin du voile qui cache nos destinées.

Ca et là, il fait descendre la sonde jusqu'au fond de cette mer brumeuse, sur laquelle s'avance le navire qui porte notre jeune nation, afin de connaître les écueils qui pourraient lui être funestes. Il s'efforce de bien se rendre compte des courants qui nous emportent, afin de savoir à quels rivages nous allons aborder; et il livre le résultat de son interrogatoire aux hommes qui pensent et qui peuvent orienter notre course vers le port de salut. Il constate un état de malaise et des éléments de dissolution au sein de notre société hétérogène et il se demande avec inquiétude quels toniques assez énergiques il faudrait lui infuser pour enrayer les ravages de ces germes morbides qui menacent de la précipiter dans des crises fatales.

Ce n'est que comme un *Obiter Dictum* qu'il hasarde une réponse à des questions sur lesquelles il cherche plutôt à provoquer une discussion qu'à trancher en dernier ressort. D'ailleurs, organiser une société à l'avance, d'après des principes abstraits, tailler une constitution de toute pièce en anticipation de choses prévues, d'après le concept des probabilités humaines, est une opération difficile et peu chanceuse, qui demande une dévination prophétique, j'allais dire du génie.

S'il est vrai de dire que chaque génération d'avance, à son insu, porte en elle-même son avenir et son histoire, il ne faut pas oublier également que bien des calculs tombent à l'eau par suite d'événements non prévus et que souvent les sociétés ne sont pas l'œuvre de la logique. D'ordinaire, c'est à la suite de tâtonnements prolongés, d'enquêtes longues et minutieuses et de retouches constantes qu'on parvient à trouver la formule voulue du problème et les conditions appropriées et durables

de la constitution la plus en harmonie avec les besoins, les tendances et les aspirations d'une nation. Les premiers pionniers qui s'aventurent dans ces sentiers non battus, sont obligés de se frayer une voie au milieu de régions inconnues et de mirages décevants. Ces tentatives d'exploration, pour incomplètes qu'elles soient, redisent néanmoins la hardiesse et la trempe de caractère de ces osés. Elles aplanissent la route à ceux qui, plus tard, profitant des travaux de leurs devanciers, se jettent dans la même entreprise hasardeuse. Ce mérite en vaut bien d'autres. Quoiqu'il en soit, on ne refusera pas à M. Royal, j'en ai l'assurance, des éloges bien mérités pour les belles pages d'économie politique et d'études ethnologiques dont cet ouvrage est parsemé.

Un auteur a dit: "Nos idées sont comme les vignes, ces flexibles "lianes, qui demandent un appui pour se charger de fleurs et de fruits."

Dans cet ouvrage, M. Royal se proposait un but noble et patriotique. Il espérait, en répandant des idées de respect et de tolérance mutuelle, mettre à la base de nos assises sociales des principes de justice et de vie. Ces principes, en s'élevant sans contrainte et sans entrave, pourraient demeurer toujours à hauteur d'appui de l'arbre national et permettre à chaque race d'atteindre son plein développement et sa parfaite maturité.

Je crois en avoir assez dit pour faire connaître les principaux traits et les œuvres de M. Royal. Les consolations de la religion embaumèrent sa vie, cette tente dressée pour un jour. Lorsque les dernières ombres du crépuscule se furent répandues dans sa chambre où se dressait déjà le spectre de la mort, la douce espérance vint s'asseoir à son chevet et répandit sur ses yeux à demi éteints les premières lueurs de l'immortel et glorieux matin qui se levait pour lui.

Il ne me reste plus qu'à déposer sur la tombe de cet homme de bien, au nom de ses collègues de la Société Royale du Canada, le témoignage de leurs sincère admiration pour ses talents supérieurs, ses grandes qualités morales, son attachement profond à l'Eglise catholique et à sa nationalité et les services éminents qu'il a rendus à sa patrie.

II.—*Les Capitaines de Marin, sieurs de la Malgue, Chevaliers de St-Louis, officiers Canadiens, etc., en la Nouvelle-France, de 1680 à 1762.*

Par REGIS ROY.

(Présenté par B. Sulte et lu le 23 juin 1904.)

Autour des grandes figures de notre *Histoire*, viennent souvent se grouper des personnages dont les noms sont accompagnés de qualificatifs tellement élogieux, que le désir naît en nous de pouvoir les connaître plus amplement, mais, à quelques mentions ici et là dans nos annales, se borne notre connaissance avec eux, et, comme c'est parfois le cas que différents personnages, portant le même nom, ont séjourné en la Nouvelle-France, il est arrivé à quelques-uns de nos historiens, n'ayant pas de moyens de vérifications sous main, ou, induits en erreur par leurs déductions, de confondre ces personnes en une seule, ou bien, de porter au crédit de l'une, telle action ou affaire brillante, glorieuse, qui de droit appartient à une autre.

Ces choses, cependant, se rectifieront avec le temps et au fur et à mesure de la mise en lumière de vieux documents, correspondances, etc., se rattachants à l'époque de l'administration française en Canada.

Les Capitaines Marin de la Malgue ont joué un rôle important dans les postes de l'ouest, et ils ont souvent conduits de ces pays "d'en haut," des bandes de sauvages contre les soldats de la Nouvelle-Angleterre.

Il y a eu trois ou quatre familles Marin, en Canada, de 1680 à 1760, et *Tanguay* et *Daniel*, entr'autres, en parlant d'elles se sont souvent trompés, mêlant les membres d'une famille avec ceux d'une autre. Sur ce point, nous voulons rétablir l'ordre; c'est le but des quelques pages qui suivent.

I

La tradition conservée depuis 1668 et avant dans la famille de MM. de Marin, porte qu'elle est originaire de la ville de Gênes, et que Paul Marini et Julie Négroni, sa femme, furent père et mère de Jacques Marini, qui étant sorti de Gênes à cause des factions des Adornes et des Frégoses, vint s'établir à Toulon, vers l'an 1400, où le roi lui fit don d'une tour, et où il y fit bâtir une maison que ses descendants possédaient encore en 1768, et cette même tradition fondée sur d'anciens mémoires de famille porte de plus, qu'il épousa Isabelle Palavicini, duquel mariage naquit Pierre Marini ou de Marin, auteur du premier

degré, mais les titres produits devant les commissaires généraux établis pour la recherche des nobles en Provence, ne parlant point de ces deux premiers degrés, on ne commence les filiations que depuis noble Pierre Marini ou de Marin, maître d'hôtel du roi, en 1496; premier consul de Toulon, en 1497; viguier et capitaine pour le roi en la même ville, en 1502.

Pour en venir au premier personnage de cette famille qui va nous intéresser plus particulièrement, il faut commencer au sixième échelon: Charles-Paul de Marin, écuyer, chevalier de l'Ordre royal et militaire de Saint-Louis, capitaine dans les troupes détachées de la marine, en Canada, qui passa en Amérique à la suite du régiment de Carignan,¹ et servit avec zèle en Canada. Charles-Paul naquit de Pierre de Marin et de demoiselle Croizet, établis à Marseille.²

Tanguay dans le volume I, page 412, de son *Dictionnaire Généalogique*, dit que *César*, baptisé en 1633, était fils de Jacques Marin et d'Hélène Gorel; au volume V, page 513, il met 1636, et le nomme Charles-César.

La généalogie faite pardevant d'Hozier, par le petit-fils de ce même Charles-Paul, non Charles-César, fut appuyée de preuves, de documents, et par des témoins irréfutables. Nous relevons donc déjà un désaccord entre ces deux généalogistes, mais passons; nous en verrons bien d'autres..... il ne faut pas se formaliser si tôt!

Charles-Paul eut de Marie-Madeleine Niquet, qu'il épousa le 5 juillet 1691, à St-François-du-Lac:—

1. Paul, baptisé à Montréal le 19 mars 1692;
2. Catherine-Marguerite, baptisée le 17 janvier 1696, à Laprairie;
3. Louis-Hector, baptisé aussi à Montréal, le 4 septembre 1697.

Son parrain fut M. de Callières.³

D'Hozier dit: Charles-Paul de Marin, mort en Canada, y avait été marié en 1690, avec demoiselle Niquet, fille de Ne Niquet, seigneur de Chasserat, et eut de son mariage: une fille et deux fils.

Jusqu'ici, ce n'est pas trop mal. Mais Tanguay lui donne une seconde alliance en 1703, à Sorel, moins de quatre mois après le décès de Marie-Madeleine. Ce qui surprend c'est que le généalogiste royal passe cette seconde alliance sous silence et les cinq enfants qui en sortirent. Cependant, le petit-fils de Charles-Paul, rentré en France en 1764, seulement qu'une soixantaine d'années après ce second mariage de son aïeul, ne parle que de sa grand'mère Niquet, et comme une dizaine ou plus de gentilhommes retournés aussi en France après la cession viennent témoigner que Joseph est le petit-fils de Charles-

¹ Voir plus loin la lettre d'un M. de Marin.

² D'Hozier, *Armorial de France*, Vol. VI, p. 285.

³ Notes privées que je dois à l'obligeance de M. Benjamin Sulte.

Paul de Marin; qu'ils ont vu ses papiers de famille à Québec, perdus à la prise de cette ville, et comme ils observent tous le même silence que Joseph de Marin, il faut bien croire que Mgr Tanguay a fait fausse route en mariant Charles-Paul une deuxième fois.

Marie-Louise Lamy, donnée comme seconde épouse de M. de Marin, est probablement la première femme de Charles-César Marin, fils de Jacques et d'Hélène Gorel, de Notre-Dame de Saint-Sulpice, diocèse de Toulon, Provence, mais elle ne l'est certainement pas de Charles-Paul de Marin, fils de Pierre, et de demoiselle Croizet, de Marseille. Voilà deux cas étrangers, et partant de là, César Marin, sieur de la Massière, commandant au fort Rolland, en 1707, mari de Louise Lamy, n'est pas Charles-Paul de Marin. Tanguay ajoute que César commandait au fort précité en 1728, mais Charles-Paul n'était plus en 1713.

Charles-Paul venant au Canada, portait une lettre du ministre de la marine, le recommandant au gouverneur de la colonie, à titre de gentilhomme sorti d'une famille génoise protégée par le roi.

En 1683, Marin figure comme ayant brillé sur les champs de bataille avec d'autres officiers de mérite. En 1684, il est désigné capitaine. En 1688, il obtint la permission de passer en France, mais s'il en profita, il revint aussitôt puisqu'il se marie en 1691, à St-François-du-Lac. Enfin, en 1696, on le dit excellent officier.¹

II

Avant de parler de Paul (fils de Charles-Paul) qui continue la descendance, consacrons quelques lignes à ses deux autres enfants. Catherine-Marguerite épousa le 6 juin 1703, François-Michel Renou, à St-François-du-Lac; elle mourut à cet endroit, le 15 janvier 1747. Son frère, Louis-Hector, s'est marié avec Marie-Anne LeGardeur. M. Sulte, dans ses notes privées qu'il nous communique, croit que c'est l'officier qui a spéculé avec Bigot et autres, sur la traite de l'ouest, et qu'en 1750 il partit pour remonter le Mississippi et faire le commerce de fourrures. Tanguay place son décès à 1742; ce n'était donc pas lui, mais bien Paul qui pratiqua le commerce de la traite dans l'ouest, et que nous allons suivre maintenant. . Auparavant, plaçons en regard, D'Hozier et Tanguay au sujet du mariage de Paul Marin et des enfants qu'il en eut; de la sorte, on saisira plus facilement la différence entre les deux énumérateurs:—

D'HOZIER:

(Armorial de France, Vol. VI.)
Paul épouse dame Marie-Josette
Dion des Prés,² dont:—

TANGUAY:

(Dictionnaire généalogique, Vol. V.)
Paul épouse le 21 mars 1718, à Mont-
réal, Marie-Joseph Guyon, âgée de
17 ans;

¹ L'abbé Daniel, *Les Grandes Familles*, etc., Vol. II, p. 183.

² M. Sulte dit qu'elle était cousine de madame de Lamothe-Cadillac.

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Joseph Marin de la Malgue. 2. Paul, mort officier dans les troupes détachées de la marine en Canada. 3. Geneviève, mariée au chevalier de la Roche-Vernay.¹ | <ol style="list-style-type: none"> 1. Joseph, baptisé à Montréal le 5 février 1719; 2. Marie-Joseph, baptisée à Montréal, 15 août 1722; 3. Marie-Joseph, baptisée à Montréal, 31 juillet 1726; s même place 9 mars 1733; 4. Pierre, baptisé à Montréal, le 16 juillet 1727; s Montréal, 16 février 1733; 5. Marie-Madeleine, baptisée à Montréal, 12 septembre 1729; 6. Geneviève, baptisée à Montréal, 12 juin 1732; mariée à Montréal le 2 avril 1755 à Charles-René de la Roche-Vernay; 7. Paul, baptisé à Montréal, 18 avril 1738; s à Montréal le 21 septembre 1755. |
|---|--|

Paul s'est occupé de la traite, et en 1727, lorsque s'est formée à Québec la compagnie des Sioux, il y paraît comme associé.

En mars 1730, le sieur Marin, brave officier, marcha contre les Renards (Wisconsin) et leur livra un engagement sérieux.² En effet, l'engagement a pu être sérieux par l'influence morale de son action énergique contre ces barbares, mais s'il fallait en croire l'historien Américain et d'autres, il s'agirait ici ni plus ni moins que de l'extermination entière des Renards; cependant, on les voit à différentes reprises plus tard figurer dans d'autres combats. Pour s'en convaincre il suffit de parcourir la copie de la correspondance officielle du temps, que contient le bureau des Archives, à Ottawa.

En 1731-2, Paul est avec les sauvages, à six cents lieues de Montréal; son fils Joseph, âgé de 21 ans, est avec lui.

En 1732, Paul, alors âgé de quarante ans, est enseigne.³ En 1739, il est détaché pour aller à la rivière à la Roche, dans le haut Mississipi, car il était brave et aimé des nations. A cette époque on le dit enseigne en pied, et qualifié de commandant parfait.⁴

Le gouverneur Beauharnais écrivait au ministre, le 26 septembre 1741:—" Lorsque je suis venu (dans ce pays) on me l'a donné (Marin) " pour un bon sujet, qui avait été toute sa vie parmi les sauvages. J'ai " vu des lettres de feu M. de Vaudreuil, où il lui marquait qu'il était " un porte-respect dans un poste. Il a tiré les Puants d'entre les mains

¹ Tué à l'armée du prince de Condé, en 1761.

² Notes on early Wisconsin, by Rev. E. D. Neil, D.D. Wisconsin Hist. Coll., Vol. X, p. 303.

³ Abbé Daniel, Les grandes familles, etc., Vol. II, p. 193.

⁴ Idem.

“des Renards, et a toujours été prêts d'exposer sa vie pour le bien du “service.”¹

La Jonquière à son tour louange Paul Marin. Il dit que c'est l'officier le plus expérimenté pour maintenir les Sioux dans les intérêts des Français, étant aimé et respecté de ces sauvages.

En 1743, Marin père devait passer en France pour régler des affaires de famille; il avait eu cette permission pour 1736, mais comme il avait toujours été occupé dans l'ouest auprès des sauvages, il n'a pu en profiter.²

En janvier 1745, Paul va se joindre avec les cent vingt canadiens et les quatre cents sauvages qu'il commande, à Falaise de Gannes, aux environs de Port Royal;³ le détachement était bien équipé et ce monde devait se rendre sur les neiges. Marin y est alors qualifié: lieutenant.⁴ M. du Chambon lui envoya alors l'ordre d'aller se poster aux Mines. En route il est attaqué par un corsaire; il soutient l'attaque cependant, et au moment de faire l'abordage un autre corsaire vient secourir le premier et Marin dut abandonner le parti et se jeter à la côte. Cette rencontre lui ayant fait perdre plusieurs jours il arriva devant Louisbourg trop tard, car la place venait de se rendre.⁵

Le 19 août, il repartait à Québec. Le 29 novembre suivant il marche sur Sarasteau, poste Anglais à environ quinze lieues du fort St-Frédéric, ayant sous lui, à peu près 400 Français volontaires et 200 sauvages domiciliés.⁶ A son arrivée il trouva le fort abandonné, ce que voyant, il ravage les alentours et fait une centaine de prisonniers. Le chevalier Benoit lui sert d'aide-major. La troupe revint à Montréal le 9 décembre suivant.

Dans le projet de promotions du mois d'octobre, 1748, le marquis de Beauharnais rapporte que le capitaine Marin est bon officier, et s'est distingué dans plusieurs partis de guerre.

Après la mort de leur père, Mm de la Vérendrye, réclamèrent l'honneur de poursuivre son entreprise, mais Bigot les frustra de leurs espérances; il forma une société dont il fit partie et qui était composée du gouverneur de la Jonquière, de Bréard, contrôleur de la marine, et de deux officiers: LeGardeur de Saint-Pierre et La Malgue de Marin. St-Pierre et Marin, le premier plein de bravoure et fort aimé des sauvages, le second décrié par sa cruauté, mais redouté de tous ces peuples,

¹ Canada, Corr. Gen., Vol. 75, p. 273.

² Jan. Corr. Gen., Vol. 75, p. 326.

³ Envoyé par le gouverneur. (B. Sulte, Hist. des Can.-Fr., Vol. 7.)

⁴ Doc. relat. à la N.-F., Vol. III, p. 217.

⁵ Du Chambon au ministre, Rochefort, 2 sept. 1745.

⁶ Hocquart au ministre, Québec, 30 nov. 1745.

furent chargés de l'œuvre double de l'association. Marin devait remonter le Mississippi jusqu'à sa source pour découvrir la mer de l'ouest.¹

De la Jonquière qui ne perdait jamais de vue la chance de spéculer, ordonna d'abord à Marin de se rendre chez les Sioux pour y bâtir un fort de pieux.² Puis, il demande la croix de St-Louis pour ce gentil-homme, le 21 septembre 1750.

En 1752, Marin et St-Pierre revinrent au pays, avec une riche moisson; les associées firent un profit énorme. La part seule du gouverneur monta à 300,000 francs. (Smith, Hist. du Canada.)

L'année suivante, sur l'ordre du gouverneur, Paul Marin dirige une troupe composée de 300 Canadiens, avec Benoit et Péan pour majors; il a mission de se rendre à la Belle Rivière (Ohio), pour empêcher les empiètements et l'établissement des Anglais dans cette contrée. A quinze milles peut-être de Presqu'île, où il avait bâti un fort (maintenant Erie, état de Pennsylvanie), il fit un second fort de palissades,³ plaçant à l'entrée une pièce de quatre, et sur les bastions, des canons de 6. Dans le cours d'octobre, M. Marin tomba malade; ses jours étaient comptés.

Le gouverneur Du Quesne, l'année précédente (1752) avait demandé la croix pour le sieur Marin, trouvant qu'il l'avait mérité après quarante ans de services extrêmement bien remplis.

Le 29 octobre 1753, Marin rendit le dernier soupir, et fut inhumé dans le fort.

En octobre 1754, le gouverneur annonçant au ministre le trépas de M. de Marin, mandait ce qui suit:—"Je regarde la perte du sieur Marin comme irréparable dans cette colonie. Cet officier joignait à l'esprit une tête excellente et avec l'air et les manières sauvages, il a eu l'occasion de me prouver beaucoup de modération et de prudence; quand au zèle, jamais homme n'en a eu plus, puisqu'il a préféré de mourir sur le champ de bataille plutôt que de venir rétablir sa santé chez lui."

Par le même courrier, le gouverneur demandait une pension pour la veuve de Paul Marin. Je ne crois pas qu'il fut écouté, cependant elle n'aurait pu en jouir longtemps, car moins de dix-huit mois après le décès de son mari elle s'éteignait à son tour à Montréal.

¹ Garneau, vol. II, pp. 131-2.

² Canada, Corr. Gén., Vol. 95, p. 167.

³ Celui de la rivière aux Bœufs.

III

Joseph, qui continue la lignée (VIII degré) naquit en 1719. Il entra au service du roi en 1732, et l'année suivante il accompagne son père dans les postes de l'ouest. Il est sous les ordres de M. de Vercher à Michilimakinac, en 1737, et trois ans plus tard il passe dans le haut Mississippi pour y faire des découvertes et la paix avec les nations sauvages. Il revint au pays en 1745, et suit son père dans l'expédition vers Port Royal et Louisbourg. Le 1er août de cette année, il arrive à Québec envoyé par son père pour informer de la perte de Louisbourg et du retour du détachement.

Six semaines après (20 septembre), il épousait à Québec, mademoiselle Charlotte Fleury de la Gorgendière, née en 1726.¹

En 1747, Joseph est sous les ordres de Jean-Baptiste de Ramezay, en Acadie, ayant la tête des sauvages, dont il avait la confiance. En 1748, il commande 20 Français et 200 sauvages envoyés en Acadie; il attaque Beaubassin et fait des prisonniers. En 1748 et 1749 il commande encore divers détachements contre les Anglais, puis à cette dernière date il va prendre charge du poste de la pointe de Chagouamigon à 600 lieues de Montréal, où il fait la paix avec les différentes nations sauvages de cette contrée.

En 1752 il va relever son père qui pour lors se trouvait dans le haut Mississippi.

La guerre avec l'Angleterre ayant recommencé, il descendit en 1756 à Montréal avec 600 sauvages et 40 Français, à la tête desquels il défait 2,000 hommes qui amenaient des provisions au fort de Chouaguen.² Le 19 mai 1756, Coulon de Villiers partit de Lachine en expédition contre le fort de Chouagen ayant pour mission d'observer les

¹ En consultant l'abbé Daniel, *Nos gloires nationales*, article Deschambeault, p. 446, voici ce qu'on lit: "Charlotte, la troisième des filles survivantes (Fleury) d'après M. Ferland, que nous avons suivi, après avoir formé une première alliance avec M. Le Verrier, procureur-général, épousa en deuxième nocces M. Pierre Rigaud de Vaudreuil-Cavagnal, dernier gouverneur du nom. D'après la généalogie de la famille Bissot que nous possédons encore, elle unit son sort à celui du célèbre capitaine Marin, alors chevalier de St-Louis. Nous laissons ce point d'histoire à éclaircir à ceux qui sont plus à même de le faire." Eh bien! nous avons pu démêler que madame Le Verrier est la tante de mesdames Rigaud et Marin. Tanguay nous renseigne, cependant qu'il erre à son tour: il dit que cette dernière s'est mariée à Québec le 20 septembre 1745, à *Joseph Lamarque-St-Martin*. Il faut lire Joseph de Marin de la Malgue.

² Nous avons affaire à la transcription de D'Hozier du rapport qu'a dû lui faire l'intéressé Joseph Marin; il y a ici une forte dose d'exagération: cela saute aux yeux.

mouvements des Anglais; à son retour, il fut joint le 26 mai par M Marin qui lui menait un détachement de 60 Folles-Avoines.

Le 11 septembre suivant, il est à Carillon, où il dirige un coup contre le fort Lydius, près duquel il rencontre l'ennemi au nombre de 55 hommes, dont trois officiers; il les enveloppe et les défait. Un seul lui échappe: les autres sont ou prisonniers et blessés, ou tués.

Cette année il devint lieutenant, mais en 1757 il sera capitaine.

M. Marin au camp de Montcalm, en juillet 1757, commandait à 88 Poutéouatamis, dont 70 de St-Joseph et 18 du Détroit.

En 1758, il est à la tête de plusieurs petites troupes de sauvages. En 1759, M. Pouchot, d'après les ordres du général, fait passer MM. de Montigny, de Repentigny et Marin avec 80 canadiens et sauvages pour aller exécuter le beau projet romanesque et chimérique de débusquer les ennemis à la Belle Rivière. A cette occasion MM. de Montigny et Marin furent pris et reçurent la *bastonnade* par les Agniers.¹

Marin fut blessé et pris à la bataille des plaines d'Abraham; sa maison à Québec, fut totalement pillée par les Anglais, et il y perdit tous ses papiers de famille. Rentré en France après la reddition de Montréal, il reçut ordre en 1762 de s'embarquer pour Terre-neuve, où pour une deuxième fois il tomba aux mains des Anglais.

IV

Le pillage de la maison de Marin à Québec, ainsi que tout ce qui prouve les VI et VII degrés généalogiques est établi par des certificats, tous produits en original pardevant M. d'Hozier, de personnages dont les noms suivent et qui sont bien connus de nos historiens. On a désigné en même temps, l'endroit de leur résidence, en France, après la conquête du Canada, et ceci ne manquera pas d'avoir son côté intéressant.

Le premier à témoigner en faveur de M. de Marin est Pierre de Rigaud, marquis de Vaudreuil, grand'croix de l'ordre royal et militaire de St-Louis, ci-devant gouverneur-général en la Nouvelle-France, se trouvant à Paris le 20 février et le 2 décembre 1764. Il demeurerait ordinairement à St-Germain-en-Laye.

Puis vient ensuite: Jean-Baptiste de Ramezay, ancien lieutenant du roi et commandant au gouvernement de Québec, résidant à Tours, le 5 septembre 1674.

Le marquis de Lévis, lieutenant-général des armées du roi, ci-devant commandant des troupes en Canada, est à Paris le 3 décembre 1764.

¹ Autrement dit: *une course à la houlinc*, ou en anglais: *run the gauntlet*.

Michel-Ange, marquis du Quesne, commandeur de l'ordre de St-Louis chef d'escadre des armées navales à Toulon, ci-devant gouverneur-général de la Nouvelle-France, se trouve à Paris le 1er juillet 1765, par affaires, et était descendu à l'hôtel de Massiac, place des Victoires, paroisse de St-Eustache.

Messire Louis-Antoine de Lusignan, chevalier de St-Louis, capitaine au corps royal, commandant d'artillerie à Ste-Lucie, présentement à Paris (le 15 juillet 1765), logeait à l'hôtel du Saint-Esprit, rue Plâtrière, paroisse de St-Eustache, chez Messire Joseph Perthuis, ancien procureur-général du roi au Conseil Supérieur du Canada.

Michel-Ange Hughes Péan, seigneur du comté de Rostaing, Bury et autres lieux, chevalier de St-Louis, capitaine, aide-major des troupes détachées de la marine, servant ci-devant en Canada, était devenu Parisien; on le trouvait en la rue de Bourbon, paroisse de Notre-Dame de Bonnes-Nouvelles, en juillet 1765.

Messire Jean-Louis de la Corne, prêtre, avait aussi élu domicile rue de Bourbon.

M. Ignace Perthuis, ancien conseiller du roi et son procureur au siège de la prévôté et amirauté de Québec, demeurait rue St-Honoré, paroisse de St-Germain l'Auxerrois.

En dernier lieu venait le certificat de Messire Philippe Antoine d'Ailleboust de Cerry, lieutenant des troupes, ci-devant servant en Canada, étant de passage à Paris en 1765; il logeait à l'hôtel de Picardie, rue St-Honoré.

Maintenant qu'on me permette de citer une lettre très curieuse d'un cousin de Joseph Marin:

“ A Marseille, le 1er juillet 1765.

“ J'ai appris, monsieur et cher cousin, avec plaisir, que vous êtes
“ revenu du Canada, et quoique vous y ayiez perdu par la prise de Qué-
“ bec tous les titres qui pouvaient constater votre état, nous n'ignorons
“ pas dans notre famille, que Paul Marin, capitaine dans le régiment
“ de Carignan,¹ sortait de notre famille, et comme il est bien constaté
“ que vous venez de lui par toutes les attestations des généraux pour le
“ roi dans ce pays, il n'est pas douteux que nous ne vous regardions
“ comme une branche de notre famille, à laquelle nous serons toujours
“ fort attachés, et en conséquence, je vous envoie diverses copies d'actes
“ dont les originaux sont enregistrés dans la Chambre des Comptes de
“ la Province, pour qu'ils puissent vous servir dans le besoin. Vous
“ pouvez être assuré que je saisirai toujours avec empressement toutes
“ les occasions que vous me fournirez de pouvoir vous convaincre du

¹ Avant le passage du régiment en Canada.

“parfait et sincère attachement avec lesquels, je suis, monsieur et
 “cher cousin, votre très humble et obéissant serviteur,

(Signé)

MARIN,

Capitaine de frégates.

V

M. Joseph Marin de la Malgue rapporte à d'Hozier qu'il eut de son mariage à Melle de la Gorgendière (morte en 1765) les enfants qui suivent, tous nés à Québec:—

1. Joseph, né le 14 avril 1752;
2. Charles-François-Xavier, né 31 août 1757;
3. Charles, né le 18 janvier 1759;
4. Marie-Louise, née le 23 avril 1748.

Le *Dictionnaire Généalogique des Familles Canadiennes* donne ce qui suit:—

1. Marie-Charlotte, baptisée le 11 août 1746;
2. Marie-Louise, baptisée le 23 avril 1748;
3. Marie-Anne-Charlotte, baptisée le 27 juillet 1749; sépulture le 11 mars 1750, à Charlebourg;
4. Joseph, baptisé le 15 avril 1752;
5. Charles-François, baptisé le 1er septembre 1757;
6. Charles, baptisé le 18 janvier 1759.

Dans ces actes, Tanguay qualifie M. Marin: sieur de St-Martin, officier; *aussi de la Marque*.

Eh bien! il y a là trois personnages différents: Marin, St-Martin et De la Marque.

Il y eut un M. Marin, officier dans le régiment de Bourgogne, à Louisbourg; un autre, officier dans le régiment de la Reine, à Québec, sous Montcalm, et d'autres MM. Marin dans la colonie, à divers temps, mais ils sont tous étrangers à la famille que nous venons de vous présenter.

MM. de Marin blasonnaient:—*D'argent à trois bandes ondées et entées de sable.*

III.—*Eloge historique de monsieur l'abbé H. R. Casgrain,*

Par l'honorable A. B. ROUTHIER, juge en chef de la Cour Supérieure.

(Lu le 22 juin 1904.)

Une institution comme la nôtre, qui se renouvelle sans cesse, peut avoir l'illusion qu'elle est immortelle. Mais ce n'est qu'une illusion, et elle peut dire avec vérité comme chacun de nous: "*Quotidie morior.*" "Je meurs tous les jours."

Car tous les jours, ou tous les ans, pour parler plus exactement, notre société voit mourir quelqu'un de ses membres.

Les Académiciens de France, vous le savez, se décernent le titre d'immortels. Mais ce n'est qu'un vain mot, et ils savent très bien eux-mêmes que leurs œuvres seules peuvent leur assurer l'immortalité. Aussi l'immortalité académique prend-elle fin souvent du vivant de l'académicien, et quelquefois même n'a jamais existé.

Les membres de la Société Royale ne voudraient jamais s'affubler d'un titre que la postérité seule a droit de décerner. Mais s'il est parmi nous des prédestinés que la postérité honorera, ne pensez-vous pas qu'elle placera celui dont je viens vous faire l'éloge parmi les plus illustres et les meilleurs?

C'est ma conviction profonde, et j'ai l'espoir qu'en vous rappelant la mémoire de l'abbé Henri Raymond Casgrain j'aurai peu d'efforts à faire pour mériter votre attention.

Disons quelques mots de l'homme avant d'apprécier l'écrivain.

I

La vie de l'abbé Casgrain n'a été ni complexe, ni mouvementée. Elle s'est formée des événements ordinaires qui composent toute existence humaine, et je vais la résumer aussi brièvement que possible.

Il est né, le 16 décembre 1831, à la Rivière-Ouelle, dans le comté de Kamouraska.

Son père, était l'honorable M. Charles Eusèbe Casgrain, qui fut Commissaire des Travaux Publics pour le Bas-Canada, et qui mourut jeune encore en 1848. C'était un citoyen irréprochable, un père de famille modèle, un homme public honnête et éclairé, un chrétien d'une grande vertu.

Sa mère se nommait Eliza Anne Baby. Elle était la fille de l'honorable M. Jacques Duperron Baby, chef de l'une des plus anciennes



familles du Canada, établie à Détroit, quand cette ville faisait partie de notre pays.

C'était une femme d'une intelligence très remarquable et d'une éducation supérieure. Elle a publié des "*Mémoires de famille*" qui contiennent une biographie de son mari. Rien n'est plus édifiant que ce petit volume qu'on pourrait ranger parmi les œuvres de l'hagiographie contemporaine.

La paroisse natale de notre regretté collègue porte le nom de la petite rivière qui l'arrose, et aux bords de laquelle sont bâties l'église paroissiale et les rares maisons qui forment le village.

Sur la rive droite, à quelques pas d'un large pont qui la relie à la rive gauche, s'étend un long manoir faisant face à la rivière, et flanqué de jardins et de bouquets d'arbres.

C'est la maison paternelle où sont nés notre ami, et ses douze frères et sœurs. Une suite de chambres en forme l'unique étage; mais au-dessus s'ouvrent un grand nombre de mansardes, ce qui permettait d'exercer une large hospitalité.

En face du manoir, un long quai borde la rivière, et sert à la fois d'abord pour les goëlettes et les petits bateaux à voiles, et de terrasse pour les promeneurs.

C'est un paysage charmant, calme, riant et poétique, mais sans horizons, sans pittoresque et sans grandeur.

Là se sont écoulées les années d'enfance de notre ami. Il y a goûté la vie de famille avec ses charmes reposés, sa douce gaieté et son heureuse insouciance du lendemain. Il y a grandi dans le bonheur que donne la vertu, dans les joies sereines qu'apporte la piété, entre un père et une mère qui étaient des saints.

Ce milieu et cette origine sont en harmonie avec la carrière qu'il a fournie, et avec l'uniforme élégance de son style, sans élans transcendants, et sans envolées vers les régions supérieures que fréquentent les aigles. La chaude atmosphère du foyer domestique explique en même temps son tempérament méridional.

Quand on causait avec lui on le croyait volontiers du Midi, et même un peu de Tarascon.

Des fenêtres de sa chambre, l'enfant apercevait le dôme du collège de Sainte-Anne de la Pocatière, et c'est dans cette excellente institution qu'il fit ses études classiques. Il en fut l'un des plus brillants élèves.

Enclin par nature à se dévouer au bien de ses semblables, il se crut appelé d'abord à soigner les corps, et il étudia la médecine. Mais après deux années d'étude il comprit que Dieu le destinait plutôt à prendre soin des âmes; et le 5 octobre 1856, il était ordonné prêtre.

Dans les années qui suivirent, il fut successivement professeur au collège de Sainte-Anne, vicaire à Beauport, puis vicaire à la Basilique de Québec.

En 1872, une maladie des yeux qui alla toujours s'aggravant, et qui fut la grande épreuve de sa vie, le força d'abandonner le ministère, et il consacra dorénavant tous ses loisirs aux travaux littéraires et historiques. Mais il n'avait pas attendu cette époque-là pour prendre sa place dans le monde des lettres.

Dès 1860, s'était produit à Québec, parmi la jeunesse des écoles, un mouvement littéraire bien prononcé.

Garneau, Chauveau, Crémazie et Taché avaient auparavant ouvert la voie dans la conquête du domaine intellectuel. La semence jetée par eux dans le sol avait germé, et, sans les chercher ni les appeler, ils avaient formé des disciples.

Toute une pléiade de jeunes talents s'était élancée sur leurs traces, sous la double impulsion de l'amour des lettres et du patriotisme, sans autre ambition que de se faire un nom, et d'ajouter quelques rayons à la gloire nationale.

La carrière littéraire alors ne promettait absolument rien au point de vue pécuniaire; et ceux qui y entraient devaient s'attendre à se coucher souvent sans souper. Mais qu'avait-on besoin de souper alors? On vivait d'idéal, et cela nous paraissait une nourriture substantielle.

J'en parle en connaissance de cause, car je faisais partie de la jeunesse d'alors, et j'affirme que c'était le beau temps, au risque de passer pour un "*laudator temporis acti*."

Notre dernier souci était la question d'argent, et négligeant l'étude des professions dans lesquelles nous étions entrés, nous consacrons nos veilles à construire de belles phrases, à arrondir des périodes, et à scander des vers.

Hubert Larue, Louis Fréchette, Pamphile Lemay, Louis P. Turcotte, Ernest Gagnon, Joseph Marmette, A. Decelles, Buies, Faucher de St-Maurice, Nap. Legendre, Benjamin Sulte, Oscar Dunn rêvaient tous de lauriers littéraires. J'en oublie sans doute, mais je ne puis pas oublier celui qui marchait en tête de ce groupe, l'abbé Casgrain.

Avouons qu'il n'était pas encore à cette époque entré dans sa vraie vocation. En parlant ainsi, nous ne voulons pas rappeler qu'il a étudié la médecine avant d'embrasser l'état ecclésiastique. Nous voulons dire que, même dans la carrière des lettres, il ne s'est pas livré immédiatement à l'étude de l'histoire, qui devait pourtant donner à sa vie plus d'utilité, plus d'intérêt, plus de charme, et plus de renommée.

Son premier ouvrage, publié en 1861, avait pour titre: "*Légendes Canadiennes*." C'était une œuvre d'imagination, et un exercice littéraire. Le jeune auteur semblait y faire l'essai de ses facultés poétiques, et vouloir démontrer qu'entre son genre de prose et la poésie il n'y avait pas d'autre différence que la rime.

Mais les "Légendes" prouvaient surtout que le débutant avait une imagination qui manquait de mesure, et un goût exagéré pour les figures de rhétorique. Il y révélait des dons précieux, et de remarquables aptitudes. Mais la maturité et la formation littéraire que donne l'expérience faisaient défaut. Le style exubérant de jeunesse, était trop recherché, manière, chargé de couleurs, ennemi du naturel, de la simplicité et de la précision.

A cette époque, il manifestait des tendances agressives et militantes. Or il se trouva que mes dispositions étaient semblables, et nous croisâmes le fer, je veux dire la plume.

Je viens de relire mes polémiques d'alors, surtout celles que j'ai signées "Jean Piquefort," et j'en regrette sincèrement les sévérités d'un caractère personnel; mais quant à ce qui était critique littéraire proprement dite, je ne crois pas avoir beaucoup dépassé les limites permises à la satire.

C'est mon impression sincère, après avoir relu les "Légendes."

Vers ce temps-là furent fondées à Québec les "Soirées Canadiennes," et l'abbé Casgrain en fut l'un des principaux collaborateurs. Puis il publia successivement quelques biographies dont il avait bien connu les personnages. C'étaient le chevalier Falardeau, F. X. Garneau, notre historien national, G. B. Faribault, et P. de Sales Laterrière.

C'est par là qu'il sortit du domaine de la fiction pour entrer dans celui de l'histoire.

Mais c'était l'histoire de ses contemporains, et c'est vers le passé qu'il ne tarda pas à se sentir attiré. Les vrais historiens font leurs délices de vivre avec les morts illustres.

Et, comme prêtre, il se tourna tout d'abord vers les saintes fondatrices de nos principales institutions de femmes. Il publia alors successivement l'histoire de la Vénérable Mère Marie de l'Incarnation, et l'histoire de l'Hôtel-Dieu de Québec.

Entre temps, il s'était essayé dans la poésie, et il avait publié un petit volume de vers intitulé "Les Miettes." Mais la versification gênait son allure prime-sautière, et il revint à la prose, ce "mâle outil" que vante Louis Veuillot.

Après les "Soirées Canadiennes," le "Foyer Canadien," et plus tard le "Canada Français" ont tour à tour bénéficié de sa collaboration.

Travailleur infatigable, et chercheur éclairé, notre illustre ami entassait les matériaux et les documents, et quand il avait épuisé nos archives, il allait en Europe y poursuivre ses recherches. Epris de la gloire de sa race et confiant dans ses destinées, il avait assigné comme but à sa vie de la faire mieux connaître et de la glorifier.

C'est dans ce but qu'il allait passer les hivers à Paris, et qu'il bouquinait dans les bibliothèques publiques et les Archives de l'Etat.

En même temps, il y nouait des relations avec toutes les célébrités contemporaines, et il s'en faisait des amis. Dans mes propres voyages en France, j'ai rencontré je ne sais combien d'hommes qui l'avaient connu, et qui me parlaient de lui avec admiration et amitié.

Ses recherches ne se bornaient pas aux bibliothèques publiques. Elles s'étendaient aux archives privées, et aux papiers domestiques des descendants des anciennes familles du Canada, retournées en France à l'époque de la conquête.

Il y fit des découvertes précieuses, et le gouvernement de Québec a publié une volumineuse collection de documents, qui se compose uniquement des manuscrits trouvés par lui en la possession des descendants du chevalier de Lévis.

Il a tiré grand parti de cette collection dans son bel ouvrage en deux volumes in-8o intitulé: "Montcalm et Lévis."

C'est la dernière et la plus remarquable de ses œuvres; mais elle avait été précédée d'un autre ouvrage historique de grand mérite, couronné par l'Académie Française: "Un Pèlerinage au Pays d'Évangeline."

A part tous ces travaux littéraires que je n'ai fait qu'indiquer, il y a de nombreux écrits de l'abbé Casgrain qui sont disséminés un peu partout, dans les journaux et les revues. Ce sont des monographies, des critiques littéraires, des études archéologiques, et des lettres.

Enfin, il a consacré les dernières années de sa vie à rédiger ses "mémoires" qui doivent avoir beaucoup d'intérêt, mais dont nous n'avons pu prendre connaissance.

Cette brève esquisse historique doit suffire à vous convaincre, messieurs, que la vie de notre regretté collègue a été bien remplie. Ce n'était pas un oisif, et il n'a jamais voulu se reposer sur les lauriers qu'il avait moissonnés çà et là.

Le travail était pourtant pénible à ses pauvres yeux malades. Mais il avait le zèle de l'apôtre, et la passion du patriote. Il croyait à sa mission littéraire, et il eut l'énergie de la remplir jusqu'au bout.

Examinons maintenant de plus près le mérite de son œuvre.

II

Celui qui croit écrire l'histoire en reproduisant, analysant, ou résumant des documents et des archives, en racontant les faits, par ordre de date, sans en montrer l'enchaînement ni les leçons, celui-là commet une grave erreur; car il ne fait pas œuvre d'historien.

La vraie histoire n'est pas seulement une œuvre d'érudition, mais une œuvre d'art; et ce que l'art doit y mettre, c'est le mouvement et la vie.

Le passé est une chose morte. Mais il fut un temps où cette chose vivait, marchait, parlait, agissait. En la remettant sous nos yeux, l'historien doit lui rendre la vie, et son tableau ne peut être fidèle que s'il est animé.

Dans le véritable historien il doit donc y avoir deux hommes, l'érudit et l'artiste. L'érudit apporte les matériaux, et l'artiste les choisit, les ordonne, les dispose, et leur donne le relief et le mouvement qu'ils avaient jadis.

Dans une histoire bien faite, il faut que tout soit rangé avec ordre et mis en pleine lumière. Les événements doivent défiler comme des troupes qui passent en revue.

Les simples soldats, c'est-à-dire les menus faits, sont nécessaires pour former les cadres, mais ils n'absorbent pas le regard ni la pensée. L'attention va aux officiers-généraux, et aux manœuvres des régiments, c'est-à-dire aux événements importants qui font époque, et qui en sont les traits distinctifs.

Est-ce à dire que l'historien doit négliger les détails? Non; car il y a des détails dont la signification est importante, tantôt parce qu'ils dessinent les caractères et les physionomies, tantôt parce qu'ils donnent aux faits leur couleur locale, tantôt enfin, parce qu'ils éclairent les points obscurs.

Est-ce tout ce que doit faire l'historien? Pas encore. Il faut qu'il sache faire revivre non seulement les actions, mais les acteurs.

Or, c'est un grand art de savoir mettre ses personnages en scène, d'en tracer les portraits, et de faire connaître leurs idées, leurs sentiments et leurs passions.

Enfin, l'historien doit être doublé d'un philosophe qui puisse comprendre la leçon des événements, et mettre en relief les enseignements qui forment la philosophie de l'histoire.

L'abbé Casgrain n'atteignit pas du premier coup ces sommets de l'art historique.

Nous l'avons dit, sa première œuvre, les "Légendes," révélait des dons précieux. Il avait le culte de la forme. Il aimait choisir ses mots, construire sa phrase avec soin afin de mettre sa pensée dans son meilleur jour. Et il avait raison; car c'est ainsi qu'il faut écrire. Il en est des idées comme des femmes: le goût et l'élégance de leurs vêtements ajoutent beaucoup à leur beauté.

Mais il y faut du goût et même de la simplicité. Le choix des mots devient un défaut s'il est poussé jusqu'à la recherche. Et puis, il ne faut pas préférer les mots rares aux mots justes, ni viser constamment à l'effet que le choc des mots peut produire. Les formules pédantes choquent encore plus que les formules banales, et les images ne plaisent qu'autant qu'elles sont prises dans la nature.

L'auteur des "Légendes" avait méconnu ces préceptes, et les défauts de cette œuvre que nous avons indiqués déjà se retrouvèrent en quelques endroits de son "Histoire de la Vénérable Mère Marie de l'Incarnation."

Certes, il y avait, entre les deux ouvrages, un contraste frappant, et le progrès de l'écrivain était considérable. Mais certaines pages trahissaient encore un culte exagéré de la phrase pour la phrase, et semblait avoir été faites moins pour exprimer des idées que pour l'harmonie des sons et le plaisir des yeux.

Ces fautes devinrent de plus en plus rares dans les ouvrages subséquents, et bientôt l'écrivain fut en pleine maturité.

En même temps que son goût d'artiste s'épurait, son trésor d'érudition s'enrichissait, sa pensée s'élargissait et s'élevait, son jugement se rectifiait, et l'historien modifiait sa méthode, de manière à se rapprocher davantage des modèles.

Ces perfectionnements sont sensibles dans le "Pèlerinage au Pays d'Evangeline." Mais on attendait mieux encore de cet historien dont la formation littéraire était maintenant complète; et le public canadien ne fut pas déçu dans son attente.

Quelques années après, parut en effet son œuvre capitale, consacrée à nos deux grandes gloires militaires, "Montcalm et Lévis."

Dans l'histoire de tous les peuples il y a des époques qui en marquent les grandes étapes, ou ce qu'on pourrait mieux nommer les évolutions.

Elles signalent des changements de routes, des départs pour de nouvelles destinées, des acheminements vers un but nouveau.

Presque toujours alors la nation a ses grands jours de triomphes et de victoires, ou bien de grandes infortunes, et quelques fois les deux, un mélange de gloire et de malheur.

Ce sont ces époques de l'histoire qui attirent les historiens, et que les poètes aiment à chanter. Et toujours elles se personnifient dans quelques hommes, qui en deviennent les héros.

Pour les Canadiens-français, cette époque d'évolution a été celle de la conquête, et elle s'est incarnée dans deux hommes qui ont été nos plus grandes illustrations militaires: Montcalm et Lévis.

C'est autour de cette époque et de ces noms illustres que nos historiens et nos poètes ont gravité tour à tour; et c'est à eux que notre ami a consacré ses derniers travaux historiques.

L'ouvrage qui contient près de onze cents pages in-8o est du plus puissant intérêt, et très documenté. L'auteur a fermé la porte à son imagination, et il a laissé parler les documents.

La narration est remarquable de précision et de clarté, et elle emprunte aux événements eux-mêmes leur éloquence et leur intérêt drama-

tique. Mais quel courage et quelle patience il a fallu pour feuilleter et déchiffrer toute cette bibliothèque de manuscrits dans lesquels l'auteur a cherché la vérité historique!

Comme exécution, nous croyons que c'est son œuvre la meilleure. Le style en est grave et mesuré en même temps qu'élégant. Le récit est vrai, plein d'ampleur et de souplesse; mais il n'est pas sec, et l'on y sent l'émotion et le sentiment.

Le sujet était le plus beau et le plus grand que notre histoire pût offrir au talent de notre ami, et il en a été digne. Aussi semble-t-il qu'après l'avoir traité il se soit dit "*exegi monumentum.*" "J'ai élevé mon monument, ma carrière est finie."

III

L'abbé Casgrain a passé les dernières années de sa vie au couvent du Bon Pasteur, à Québec, et malgré la perte graduelle de sa vue, il y vivait très heureux.

A côté de son appartement, la chapelle du couvent lui offrait une retraite paisible où il pouvait faire à loisir les méditations qui élèvent l'âme et les prières qui la consolent.

Dans sa chambre de travail étaient entassés ses chers livres, ses souvenirs de famille, et de voyages, sa correspondance, quelques objets d'art, et ses nombreux manuscrits.

Au rez-de-chaussée sa salle à manger trop étroite pour son grand cœur, était bien l'une des plus joyeuses que j'aie connues dans ma vie. Ses dîners étaient bons, mais ce qui en faisait le charme, c'était sa gaité, son entrain, sa verve, son amabilité, et son esprit plus pétillant que le champagne. Quelles histoires désopilantes il nous racontait! Quelles charges spirituelles il accumulait sur la tête de ceux qui avaient eu l'heur de lui déplaire, ou qui publiaient des œuvres ridicules!

Son naturel tout entier s'épanchait alors sans contrainte. Il donnait libre cours à son humeur vive et prompte à la saillie. Son esprit prime-sautier, alerte, et toujours en éveil, se révélait alors dans tout son éclat dès qu'on le harcelait un peu; et sa verve avait des envolées, des fugues, des décharges électriques, qui partaient comme des fusées, et qui nous jetaient dans des convulsions de franc rire.

Mgr Laflamme, Mgr Mathieu, le Consul-Général de France, M. Klezskovski, M. Siméon Lesage, et plusieurs autres amis en garderont longtemps le souvenir.

Rien ne ressemble plus à une aurore qu'un beau coucher de soleil. Ce sont les mêmes rayons du même astre, les mêmes teintes de feu, les mêmes variétés de reflets et de couleurs. Seulement le décor a changé de théâtre, et il se développe à l'extrémité opposée de l'horizon.

L'aube et le couchant de l'existence humaine ont quelquefois, par exception, les mêmes ressemblances; et notre ami, l'abbé Casgrain, a été une de ces exceptions qui conservent jusque dans un âge très avancé la vivacité d'esprit, la verve, la gaité, l'entrain des jeunes années.

Au fond de ses prunelles éteintes, il faisait nuit; mais dans son esprit et dans son cœur non seulement il faisait jour encore, mais c'était encore le matin et la pleine lumière. Sa parole était restée chaude, animée, vibrante.

Il avait hérité de ses parents le goût des vieilles choses et des idées nouvelles, l'enthousiasme chevaleresque et l'ardeur des fortes convictions.

Quand la cécité devint complète, elle le détacha forcément des choses extérieures et concentra ses facultés vers les intérieures. Privé de contempler les beautés de la nature, il se tourna de plus en plus vers la beauté idéale.

Quand le soleil disparaît à l'horizon, et que la nuit se fait, involontairement nous nous sentons envahis par une vague tristesse. Et cependant nous savons que demain le soleil reparaitra. Quelle douleur ce doit donc être de se sentir envahir graduellement par les ténèbres d'une nuit qui ne finira plus!

Mais l'abbé Casgrain était prêtre, et il croyait que le vrai flambeau qui éclaire le cachot de cette vie est la foi; aussi l'épreuve terrible que Dieu lui envoyait n'altéra pas sa sérénité, ni même sa gaité naturelle. Le flambeau de la foi remplaça pour lui la lumière du jour, et il poursuivit son chemin vers les hauteurs, "*per angusta ad augusta*."

IV.—*La maison de Borgia—Premier poste de Wolfe à la bataille des
Plaines d'Abraham—Où était-elle située?*

Par P.-B. CASGRAIN.

(Présenté par M. E. Sulte et lu le 23 juin 1904.)

Le site devenu inconnu de cette maison est important à déterminer comme servant à indiquer d'une manière précise:

1o Le premier point stratégique et le poste le plus avancé dont Wolfe se hâta de s'emparer et de fortifier aussitôt qu'il eût pris pied sur les Hauteurs d'Abraham;

Et 2o à montrer la position exacte de l'aile gauche de son armée, appuyée d'abord sur cette maison *en avant* et qu'il fortifia dans ce but dès qu'il l'eût atteinte par une marche fort avancée sur le chemin Ste-Foy; après quoi il rangea son armée en ordre de bataille.

Disons d'abord qu'il ne peut y avoir de doute sur le nom et l'identité de la famille comme de la personne du Borgia dont il s'agit; car il fut le premier et le seul de son temps, avec ses enfants, à porter à Québec ce nom nouveau au pays. Il y fut baptisé sous le nom de *François-Louis*, mais s'appelait *François-Borgia*; prénoms et nom accolés qui lui furent donnés dès sa naissance; et il maintint toujours celui de Borgia comme préfixe à son nom de famille qui était Levasseur; mais, le plus souvent, il élidait ce dernier, sauf dans quelques actes authentiques, tandis que, communément, il était connu simplement sous le nom de Borgia.

Ce nom, qui nous semble d'origine espagnole, apparaît pour la première fois par écrit, quant à lui, dans le recensement paroissial de Québec, pour l'année 1716, publié par l'abbé Beaudet en 1887. On y lit, page 11: "François de Borgia, âgé de 10 ans, fils de Pierre Levasseur, menuisier, âgé de 55 ans, et de sa seconde femme Anne Menage, âgée de 40 ans, demeurant rue qui est le long du jardin du Fort."¹

Ces énoncés s'accordent avec l'acte de baptême de François-Louis du 4 avril 1707, de même qu'avec les noms des mêmes personnes comme ses père et mère.

L'usage de mettre l'enfant admis au baptême sous le vocable d'un saint fit en cette occasion qu'on lui choisit pour patron saint François

¹ Le Dictionnaire généalogique Tanguay (Vol. V, p. 387) ne mentionne pas plusieurs des autres onze enfants de ce couple, alors vivants et portés à ce recensement. Ainsi, il omet entre autres celui qui nous occupe, né entre Barthélémy, baptisé le 16 janvier 1705, dit âgé de 12 ans, et François-Ignace, âgé de 9 ans et baptisé le 4 septembre 1708.

de Borgia, canonisé depuis peu (1671). C'est ainsi que son nom devint Borgia et en même temps son *prénom* parmi les membres de sa famille. "Saluts à notre frère Borgia," disent-ils, en s'écrivant.

Il est vrai qu'on ne peut s'en rapporter directement à lui sur cette appellation, attendu qu'il ne savait ni lire ni signer; mais en recourant à divers actes authentiques cités plus bas et au *Dictionnaire Tanguay*, on identifie sa personne et son nom aussi certainement que par sa signature.

Les branches diverses de cette lignée des Levasseur qui comptait dix frères, portaient aussi des ajoutés distinctifs à leur nom. Ainsi Pierre-Noël Levasseur, l'aîné, sculpteur et arpenteur, figure authentiquement sous le nom de "*Sieur Noël le Buisson*," entre autres à un acte devant M^{re} J. A. Panet, notaire, en date à Québec du 28 septembre 1765, lequel y cite ainsi sous ce nom le procès-verbal de cet arpenteur du 22 mai 1762. Le *Dictionnaire Tanguay* indique aussi plusieurs autres surnoms aux Levasseurs.

Ce même Louis-Borgia Levasseur, épousa à Québec, le 2 mai 1730, Hélène Moreau, qui mourut le 17 mai 1744; et en secondes noces, le 27 août suivant, (!!!) il prit pour femme Marie-Joseph Gatien. Du premier lit, il n'eut pas moins de neuf enfants, et treize du second lit. Cette paternité biblique peut atténuer, en regard des convenances modernes, sa hâte un peu trop précipitée de convoler en secondes noces avant l'an révolu. Il mourut à Québec où il fut inhumé le 8 février 1780.

Sa postérité a continué à porter le nom de Borgia comme nom de famille, et il se retrouve dans ses descendants, parmi lesquels on compte Joseph-Levasseur Borgia, avocat de renom, député marquant de 1810 à 1829, et l'un des fondateurs du *Canadien* en 1806.

Suivant les dates bien établies ci-dessus, on voit que lors du siège de Québec en 1759, cet unique Borgia était âgé de 52 ans; mais où demeurerait-il alors?

On constate qu'en 1742, il est qualifié de bourgeois à Québec, et qu'il devint alors propriétaire d'une terre dans le domaine du Roi, à St-Jean (Côte Sainte-Genève), vis-à-vis le terrain appartenant au Sr Perthuis, de trois arpents de largeur sur toute la profondeur qui se trouve du chemin Ste-Foy à la Grande-Allée, bornée du côté sud-ouest au fief St-Jean (celui de Jean Bourdon), appartenant aux héritiers du Dr Michel Sarrazin de l'Etang, et du côté nord-est aux terres ci-devant appartenant à M. D'Artigny et alors aux Dames Ursulines de Québec, suivant contrat qu'il leur en avait passé le 30 avril 1727.

Borgia tenait ce bien-fond en vertu d'un acte de vente que lui avaient consenti Simon Chamberland et Elizabeth Rondeau, son épouse, représentant les héritiers de Noël Pinguet et autres, passé devant M^{re}

Boucault, notaire royal, le 26 novembre 1742; et le 28 décembre 1758, il exhiba son titre au greffier du domaine du Roi, lequel en fit l'enregistrement au Terrier conformément à sa teneur, sauf qu'il corrigea Côte Ste-Geneviève en mettant Côte St-Jean.

Dix ans après cet achat, en 1752, Borgia est dit maître-menuisier, demeurant au village St-Jean, tel que mentionné dans un acte de quittance que le même Boucault lui consentit le 7 octobre de cette année devant Mtre Saillant, notaire à Québec.

Le 5 juin 1754, il est qualifié de bourgeois de Québec, demeurant sur sa terre, Côte St-Jean. *Greffe de Boucault, notaire.*

On découvre ensuite par un autre acte devant le même notaire Boucault, en date du 17 janvier 1756, entre Borgia et sa fille Zéline (Marie-Hélène), épouse de Jean-Baptiste Chaillé dit Maturin, qu'il est dit demeurer "à la Côte St-Jean": de plus, même jusqu'au 17 mars 1759, on voit qu'il continue encore d'habiter le même endroit, suivant que l'établit un autre acte de cette date, entre ces mêmes parties; devant Mtres Sanguinet & Lanouiller, notaires.

Il est à propos de remarquer ici qu'il n'est fait aucune mention de bâtisses dans les divers actes translatifs de la propriété de la terre de Borgia, à l'inverse de la coutume ancienne et alors suivie des notaires de ne pas omettre ces circonstances et dépendances quand elles existaient. Il faut observer aussi que les divers plans de la bataille des Plaines n'indiquent pas de maison ou habitation sur l'étendue de cette terre, et qu'on n'y trouve pas ailleurs nommément la maison Borgia.

Néanmoins, comme Borgia avait commencé par prendre la terre à ferme dès la St-Michel précédant son titre, son intention était bien de la cultiver, et il lui fallait avoir en conséquence, et à commodité auprès, les bâtisses indispensables à cette fin; et il devait en avoir puisqu'il demeurerait dans l'endroit.

C'est en effet ce qu'on découvre par un bail qu'il fit à Samuel Sills, négociant de Québec, le 2 décembre 1763, devant Mtre J. C. Panet, notaire, d'un terrain vis-à-vis le front de sa terre (celui ci-devant appartenant au Sr Perthuis sus-nommé) et situé du côté nord-ouest du chemin St-Jean, consistant et "divisé en trois clos, à une demi-lieue de la ville, sur le chemin St-Jean, ensemble une maison, grange et étable, cour, jardin et dépendances, tenant au nord-est aux Ursulines, au sud-ouest au nommé Routhier, au sud-est au chemin St-Jean et au nord-ouest au côteau Ste-Geneviève; (No 26 du cadastre de la Ban-lieue) avec certaines conditions, entre autres, de réparer la maison, "la rendre logeable, y mettre et fournir les châssis, etc."

Est-ce là la maison Borgia? Celle incendiée? Est-ce une maison inachevée ou à réparer? L'acte n'en dit pas plus long. Mais c'est bien celle en plein milieu de la bataille de Ste-Foy.

La maison et le tracé confus de l'enclos alentour que l'on distingue à peine sur le plan à petite échelle du British Museum (*The Siege of Quebec*, Vol. II, p. 257, *Doughty and Parmelee*), au nord du chemin St-Jean et marqués *a*, pourraient peut-être désigner cette maison et dépendances indiquées là comme poste occupé par l'infanterie légère de Wolfe; ou bien, ce serait l'autre plus à l'ouest, du même côté nord du chemin, occupée de même comme poste, laquelle conviendrait mieux pour la distance connue d'une demi-lieue de la ville.

En référant à la copie du plan authentique de 1834, du département des Terres de la Couronne, touchant le fief de Coulonges, reproduit et publié par l'abbé Scott dans *Notre-Dame de Ste-Foy*, vol. II, p. 246, on y voit clairement indiquées, *d'après les anciens titres*, les terres de Bourdon et de Borgia Levasseur; ce dernier comme représentant les héritiers Pierre Laporte et Pinguet (Noël). Elles se trouvent vis-à-vis de Marchmont sur la Grande-Allée, et la ligne sud-ouest des trois arpents de largeur de la terre de Borgia, vient tomber vis-à-vis le Monument des Braves, Chemin Ste-Foy.

Mais pour plus de précision encore et pour la connaissance exacte des lieux dont nous aurons besoin ci-après, il faut remonter au tracé de la route de Bourdon dès 1731, laquelle est venue à former ensuite la limite nord-est de la terre de Borgia, et au-delà de laquelle il devint, après la conquête, propriétaire d'un petit *compeau* de terre à un arpent au nord-est de cette route. C'est au sujet de ce dernier terrain que M. Doughty s'est mépris en croyant y trouver la maison de Borgia, comme nous aurons occasion de le démontrer ci-après.

Continuons. En effet, nous voyons par un procès-verbal du 31 mai 1790, dressé à la requête de Sieur Melchior Poncet,¹ maître-boulangier de Québec, homologué le 10 juin suivant, que Jean Renaud, sous-voyer du district de Québec, s'est transporté à St-Jean, près de Québec, sur la ligne entre la terre qu'il tient de Simon Chamberland (l'auteur de Borgia) et les Révérendes Dames Ursulines, pour reconnaître une route de traverse pour aller à la Grande-Allée, anciennement tracée par M^{re} Jean Lanouiller de Boisclair, grand-voyer, ainsi qu'il appert par son procès-verbal du 20 juillet 1731; sur quoi, le sous-voyer Renaud, voyant que cette route n'avait pas été pratiquée, fit tirer une ligne par le sieur Ignace Plamondon, père, arpenteur-juré, sur laquelle

¹ Ce Poncet était devenu le représentant Borgia, lequel conjointement avec sa seconde femme et ses fils Louis Borgia Levasseur et Joseph-Marie Borgia Levasseur, et comme aux droits de la Vve Chaillé, sa fille, héritiers de leur mère Hélène Moreau, vendirent leur terre de St-Jean au sieur Jean Roy, maître-traiteur de Québec, par acte devant M^{re} J. A. Panet, notaire, le 30 octobre 1766; et par ce dernier, elle parvint au nommé Poncet, devenu propriétaire en 1790. Cette terre comprend les lots du cadastre et plan officiels de la banlieue de Québec, numéros 76, 77, 78 et 79.

les dites Dames pourraient établir une clôture qui leur servirait de borne entre elles et le chemin, ayant déduit et pris la moitié du terrain réservé par le Sr de Boisclerc de 24 pieds de large pour l'usage du chemin, six pieds pour les fossés des deux côtés et trois pieds pour placer les clôtures.

Il y est dit de plus que de Boisclerc s'était d'abord transporté sur le chemin qui paraissait avoir été anciennement pratiqué entre la ligne qui sépare les terres de MM. Sarrazin et de Nicolas Pinguet appartenant alors au nommé Chamberland, qui était un chemin de tolérance, et qui depuis quelques années laissaient les gens en souffrance parce que les propriétaires des terres les avaient ensemencées et avaient bouché par clôtures les chemins; et ayant remarqué que le dit ancien chemin était impraticable par les mollières qui s'y rencontraient, il ordonna que les révérendes Dames Ursulines de Québec et le nommé Simon Chamberland, habitant de la Côte Ste-Geneviève (lieu St-Jean), tireraient dans la ligne de leurs terres un chemin de vingt-quatre pieds de large le long de leurs dites terres, comme étant l'endroit le plus commode et le plus sec et où il se trouve moins de mollières.

En conséquence, le dit Jean Renaud, voyant que les dites Dames avaient déjà laissé du terrain pour le dit chemin, il ordonna qu'il y serait travaillé incessamment, ainsi marqué, par les intéressés d'un bout à l'autre, pour demeurer chemin royal et public à perpétuité. Cette route, peu passante aujourd'hui, n'étant qu'à quelques arpents du chemin du Belvédère, continue néanmoins d'être indiquée dans le cadastre et sur le plan officiels de la Banlieue de Québec, comme *route Bourdon*. Elle est tracée de même comme route publique par l'arpenteur Louis Perrault, suivant son plan de mai et juin 1790, pour délimiter les diverses propriétés foncières des Dames Ursulines de Québec dans la Banlieue. Son rhumb-de-vent, sur toute sa longueur de onze arpents, est marqué courir 26°30' ouest, et elle débouche sur la Grande-Allée à 135' pieds de l'extrémité ouest du Champ de Courses et vis-à-vis Marchmont.

Nous trouvons donc en 1759 une habitation de Borgia au nord sur le chemin Ste-Foy et sa terre au sud, attenant vers l'est à la route Bourdon; le tout situé précisément à une demi-lieue de la ville de Québec; deux points établis et prouvés par une preuve authentique et scientifique.

La difficulté est de relier la maison à cet endroit à celle du poste avancé de Wolfe sur le même chemin, savoir celle qu'il fortifia et sur laquelle resta appuyée, pour lors, l'aile gauche de son armée, jusqu'au temps où il en fut chassé peu avant l'engagement général du combat et après qu'on y eût mis le feu.

Les collaborateurs du "*Siege of Quebec*," et M. Doughty nommé (Vol. III, p. 118 et Vol. VI, p. 287, plan 20), placent cette maison au pied de l'Avenue-des-Érables; et sur le plan de la bataille, celui de M. Doughty, Vol. III, p. 90, il indique par le chiffre 8 l'endroit de la maison et propriété de Borgia, d'après un plan de 1766. C'est-à-dire qu'il la met sur la rue Simard d'à présent, entre le nouvel établissement des Franciscains (No 27 du cadastre) et la demeure de feu R.-H. Smith (lot 74 du même cadastre), sur le chemin Ste-Foy.

Nous avons pris un calque de ce plan (si toutefois il peut comporter ce nom), grâce à l'obligeance des Dames Ursulines, qui le conservent dans leurs archives. Elles l'ont coté au dos "1766-2"; il est non signé et attribué par elles à Noël Levasseur. C'est un simple croquis à main-levée, sans date, sans rhumb-de-vent, et à sa face, il se montre incorrect en ce que les lignes des terres au lieu de tomber à angle droit sur la Grande-Allée, y font un angle considérable de 20°. Il se réduit, comme son en-tête le comporte, à un aperçu approximatif pour localiser les terres des Ursulines en ces endroits à cette date.

Cependant, prenons-le tel qu'il est pour démontrer facilement la méprise de M. Doughty, faute d'en avoir examiné avec soin la portée et la valeur, et d'avoir fait un mesurage des lieux, et notamment, d'avoir compulsé les anciens titres qui se rapportent à la propriété ainsi mise au nom de Borgia Levasseur, dont le nom se lit en effet à l'extrémité ouest de ce plan, sur le chemin Ste-Foy.

M. Doughty n'a pas fait attention au nom de Noël Pinguet et de Le Vallon au-dessous de celui de Borgia, sur la même terre, ce qui l'aurait amené à la jonction de la route Bourdon à la Grande-Allée, à l'endroit appelé Marsolet; ce qui l'aurait aussi conduit à identifier correctement et localiser le terrain dont il s'agit et s'apercevoir qu'il est loin de l'Avenue-des-Érables, comme nous l'allons démontrer.

En 1766, les Dames Ursulines continuaient d'être bornées au tracé de la route Bourdon qui les séparait de Borgia, et il est facile d'expliquer comment il se fait que le nom de Borgia Levasseur se retrouve de leur côté, à un arpent de la route environ, sur la même terre y attenante, laquelle provenait en partie ci-devant du nommé Le Vallon. Lors de leur achat de M. D'Artigny (le 30 août 1727, Rageot, notaire, ci-dessus mentionné), celui-ci n'avait pu leur vendre que les trois-quarts de la terre du bonhomme Le Valon, située à cet endroit, nommée vulgairement *Marsolet*, laquelle attenait du côté sud-ouest à celle ci-devant de Noël Pinguet, et que le tracé de la route de Bourdon allait séparer comme borne future. L'autre quart appartenait alors au même Noël Pinguet, représentant aussi des droits analogues à ceux de Le Valon. Pendant que Pinguet et ensuite ses représentants Chamberland et Borgia, bornaient ainsi les Dames Ursulines de leur côté sud-ouest, elles étaient restées bornées du côté du nord-est au même Pinguet en partie,

par le haut, et à ses héritiers ensuite, à cause du morceau de terre de la part du quart qui leur appartenait et qui se trouvait située à l'encoignure du bout nord de la terre, sur le chemin St-Jean. Notons que les Pinguet étaient originairement propriétaires de chaque côté de la route avant qu'elle fut tracée, c'est-à-dire de deux lots étant en tout de trois arpents soixante-dix perches de front.

Or, Charles Pinguet de Montigny, fils de Nicolas, petit-fils de Jacques Pinguet de Vaucour¹ et arrière-petit-fils de Noël Pinguet, ayant atteint son âge de majorité, vendit ce morceau de terre à Louis-François Borgia, le 20 octobre 1762, par contrat devant Saillant, notaire. Il consistait en "deux arpents de front sur quatre arpents de profondeur, situés à St-Jean, tenant d'un bout par devant au chemin St-Jean, par derrière aux Dames Ursulines de Québec, et d'autre côté à "la veuve Lambert," laquelle était aussi une héritière Pinguet, celle ci-dessus nommée Elizabeth. Le tout sans mention de bâtisses.

Le vendeur déclare que ce terrain lui vient partie par le décès de son père et partie pour l'avoir acquis. On le trouve compris dans le lot No 80 du cadastre de la Banlieue, au nom de Wm. Henry.

Il est donc évident que Borgia ne pouvait pas avoir une maison là en 1759, puisqu'il n'est devenu propriétaire qu'en 1762, d'autant plus qu'il n'en avait pas besoin, puisqu'on lui a trouvé une demeure à côté, à environ un arpent à l'ouest. D'ailleurs, l'endroit se trouve distant de l'Avenue-des-Erables de tout l'espace de là à la route Bourdon.

Enfin, pour trouver dans la personne de Borgia la propriété ou l'occupation alors d'une maison vers le pied de l'Avenue-des-Erables, et autre que celle qu'il habitait en 1759, nous nous sommes adressé aux Dames Ursulines qui sont les propriétaires du fond dans toute cette localité, et dont les archives sont la meilleure preuve à consulter; mais, malgré leur obligeance et leurs recherches, on ne peut rien découvrir à ce sujet. Pourtant, le nom de Borgia, comme celui de leurs autres concessionnaires, ne manquerait pas d'apparaître dans leur censier et leurs livres de comptes, s'il eût possédé là un terrain relevant d'elles directement ou indirectement.

¹ Jacques Pinguet de Vaucour et Delle Elizabeth Duperras, veuve de feu Nicolas Pinguet, et le Sr Louis Lambert, au nom et comme ayant épousé Elizabeth Pinguet, héritiers de Noël Pinguet, vendirent par acte devant Rageot, notaire, le 25 septembre 1723, à Simon Chamberland et Elizabeth Rondeau son épouse, la terre que ces derniers revendirent à Borgia en 1742. Noël Pinguet tenait de Barthélémy Gaudin et Marthe Coignal son épouse (l'abbé Scott dit *Coignat*, *Cognard*, *Cognard*), par contrat du 20 juin 1667, même notaire Rageot, lesquels tenaient partie par concession de M. de Lauzon du 17 août 1655 et partie de Jacques Gourdeau et ux. par contrat 7 juillet 1659, Peuvret, notaire.

Ainsi, nous trouvons que M. Doughty a fait double erreur en s'appuyant sur le prétendu plan de 1766 sans un examen plus attentif; d'abord, en ne localisant pas correctement le terrain, suivant les titres, ensuite en ne vérifiant pas le temps où Borgia l'a acquis.

Or, comme il ne présente pas d'autre preuve, que nous sachions, sa maison Borgia, étant sans fondement, reste en l'air, pour le présent.

Il faut la trouver ailleurs si elle ne se trouve pas là. Et avant de passer plus loin, nous ferons remarquer qu'en référant aux divers plans, tels que publiés et présentés par M. Doughty, dans le corps de son ouvrage, et nous affirmons, que sauf le sien, tous les autres plans n'étendent pas les lignes respectives des armées en présence au-delà d'à peu près la mi-distance entre les chemins St-Louis et Ste-Foy. Comment s'y est-il pris pour combler la distance et remplir la lacune jusqu'à la rue Simard et au point qu'il a marqué 8?

Nous ne voyons aucune difficulté à voir Wolfe s'emparer de la maison de Borgia que nous avons prouvée être sur le Chemin Ste-Foy, près et à l'est du Monument des Braves et même la fortifier comme d'autres en deça vers la ville. Cependant ce ne serait pas celle en avant vers laquelle il a marché sur le chemin Ste-Foy, car il lui tournait le dos. De même, nous ne pouvons admettre que c'est là la maison sur laquelle il a dû appuyer l'aile gauche de son armée, laquelle se serait trouvée à une demi-lieue de la ville, et de fait beaucoup trop en arrière de sa ligne de bataille; tandis qu'on sait qu'il s'est avancé assez loin sur le chemin Ste-Foy, comme le dit M. Doughty (*Vol. III, p. 115*), pour qu'on pût apercevoir ses troupes sur les hauteurs du coteau, en face de l'Hôpital-Général, entre l'Avenue-des-Érables et la rue Claire Fontaine; même qu'il avait dépêché des grenadiers en avant pour s'emparer de la maison de Borgia (*id., pp. 118 et 123, et IV, p. 254*).

Ceci est confirmé par la *Relation du Siège de Québec, id. vol. V, p. 332*, comme suit: "Un grand nombre de leurs troupes (des Anglais) avaient déjà monté les côtes et marchaient en bon ordre du côté de la ville, le reste débarquait et défilait malgré tous les efforts que faisaient les Canadiens pour les empêcher de se rallier; ils ne purent les arrêter par le feu continu qu'ils firent ni s'opposer à leur marche, jusqu'à un quart de lieue environ de Québec, parce qu'il ne fut pas possible de tirer du secours assez prompt du camp de Beauport."

Le journal d'un officier français (*id. Vol. IV, p. 254*), dit "Que les Anglais s'avançaient en bon ordre sur le long du chemin Ste-Foy."

Ils avaient donc dépassé de beaucoup la maison indiquée par M. Doughty et l'Avenue-des-Érables.

Mais, il y a plus; M. Doughty nous paraît commettre un contre-sens dont il aurait dû s'apercevoir, quand il place cette maison, non-seulement en arrière de la ligne de front de Wolfe, mais même vis-à-vis

ou plutôt derrière l'arrière-garde en potence de Townshend, qui formait la seconde ligne de bataille (*III, pp. 120 et 121*), ainsi qu'on peut le voir à son plan, vol. III, p. 96, chiffre 8, sur lequel il range les troupes anglaises en avant de l'Avenue-des-Erables et vers la ville; tandis que, suivant nous, cette maison doit nécessairement se trouver entre les deux armées, puisque près d'en venir aux mains, les Anglais en furent chassés et qu'on y mit le feu; ce qui les força à reprendre leur première position, ainsi qu'on va le démontrer.

Voici ce qu'écrivit sur ce point l'auteur du "*Siege of Quebec*" appuyé de ses collaborateurs (*Vol. III, p. 146*):—

"A movement on the part of the English to take possession of a house and mill on the Ste. Foye Road situated near the junction of St. John and D'Aiguillon streets, again alarmed the French right and the Canadians were ordered to set fire to the buildings, which was at once done, the British retiring to their former position."

Ce passage est tiré du *Journal abrégé d'un aide-de-camp*, Vol. V, p. 297; mais ce journal va plus loin: il y est dit que les Anglais occupaient déjà les deux maisons et en furent chassés.

"L'armée anglaise occupait..... et deux maisons en avant de sa ligne gauche lesquelles elle occupa quelque temps, mais le grand feu de nos pelotons incommodant beaucoup l'ennemi, il les abandonna après avoir mis le feu."

Le chevalier Johnstone précise davantage ce détail. Il nomme la maison de Borgia et indique la direction de celle-ci et du moulin-à-vent. Nous citons de la version anglaise du *Dialogue in Hadès*, p. 46, ne pouvant nous procurer la version primitive en français de l'auteur¹ qui n'a pas encore été publiée.

"En effet, dit-il, un mouvement que fit en ce même temps (*pendant que Montcalm tenait son conseil de guerre*) votre armée vers le moulin-à-vent et la maison de Borgia sur le bord de la hauteur, sembla favoriser cette conjecture (*une descente vers le pont de bateaux*). Mais un instant après, les Canadiens ayant mis le feu à cette maison et vous en ayant chassés, vous reprîtes votre première position."

Foligné, *id. vol. IV, pages 204 et 205*, rapporte de même, en confirmant Johnstone, que: Les Anglais étaient à se retrancher et la pre-

¹ L'étude des mémoires complets du chevalier Johnstone, au point de vue de l'art militaire, nous a fait apprécier sa haute compétence au sujet de la bataille des Plaines d'Abraham, dont il a fait une savante revue critique. Les plans et descriptions qu'il donne des diverses batailles auxquelles il a pris part, telles que Gladsmuir ou Prestonpans, Clifton-Hall, Falkirk, Culloden (2 plans), Carillon, Siège de l'Isle-aux-Noix, avec plan, et notes sur la marche du général Braddock, fournissent une preuve surabondante de son savoir, approfondi à l'école de l'expérience.

mière de leurs trois colonnes était rangée depuis le lieu de leur débarquement jusqu'à la maison de Borgia, où sept à huit cents Canadiens et Sauvages "par leur fusillade et le feu qu'ils mirent à la maison de Borgia vers les neuf heures engagèrent le fort de l'action que M. de Montcalm crut devoir soutenir et profiter du moment, etc."

Le journal d'un officier français, *Vol. IV, p. 254*, dit aussi que l'ennemi se rangeait en ordre de bataille près de la maison de Borgia qui couvrait leur gauche et s'étendait de là sur le grand chemin qui mène à la porte Saint-Louis; et que Wolfe aussitôt monté, avait envoyé une compagnie d'Écossais s'emparer de cette maison qui couvrait leur gauche; et qu'un effort fut fait pour les en déloger, ce qui amena une attaque vive et obstinée, mais sans succès, car il fut absolument nécessaire d'amener du canon pour les chasser.

Ainsi, nous ne voyons pas de possibilité de placer la maison de Borgia au pied de l'Avenue-des-Érables et derrière la ligne anglaise, suivant le plan de M. Doughty; d'ailleurs, il aurait fallu aux Français partir du moulin et aller percer cette ligne pour y atteindre la maison et amener du canon afin de les en chasser.

Or, l'attaque étant dirigée vers le moulin fut donc nécessairement repoussée de là sur le front et non sur le derrière de la ligne anglaise.

C'est pourquoi, et pour maintenir cet avantage conquis par les Français le *Journal abrégé d'un aide-de-camp* ajoute, *Vol. V, p. 297*, que "Un lieutenant et trente hommes du régiment de La Sarre (celui en ligne qui se trouvait le plus près du moulin) furent alors portés en avant de notre flanc droit pour observer les mouvements de l'ennemi par sa gauche et être averti à temps s'il eût... (...voulu...) ...nous tourner par notre droite en nous masquant sa manœuvre à la faveur de la fumée des deux maisons incendiées."

M. Doughty le dit aussi de même de ce détachement de La Sarre, *Vol. III, p. 146*.

Le lieutenant et ses hommes avaient donc débordé ces deux maisons, et si la maison Borgia a été incendiée comme on n'en peut douter, et si on continue de la placer au pied de l'Avenue-des-Érables, ces trente hommes de La Sarre auraient plus qu'atteint le point où M. Doughty la met, et durent nécessairement avoir percé la ligne anglaise pour y parvenir; ce que personne ne songera à avancer ou à admettre; car les Français ne se sont point avancés en bataille sur les Anglais jusqu'à l'Avenue-des-Érables, que l'on sache.

Si donc nous écartons cette maison de cet endroit, d'abord parce qu'elle n'existait pas là, comme maison de Borgia, ensuite parce qu'elle ne saurait être placée derrière la ligne de Wolfe; s'il nous faut aussi écarter celle à une demi-lieue de la ville comme beaucoup trop éloignée

de la ligne anglaise, voyons donc si nous ne pourrions pas la placer ailleurs entre les deux armées et lui retenir son même nom de Borgia.

* * *

Nous avons vu que le chef de famille de ce nom avait eu de son premier mariage, plusieurs enfants, citons entre autres deux fils, appelés comme lui Borgia. Tous deux étaient en âge en 1759. L'aîné, Louis-Borgia Levasseur, baptisé le 15 avril 1733, avait vingt-six ans. L'autre, Joseph-Marie Borgia Levasseur, baptisé le 21 octobre 1735, atteignait ses vingt-quatre ans.

Ne serait-ce pas d'une maison de l'un d'eux ou même de leur père, près du moulin, dont il s'agirait et laquelle serait celle que nous cherchons?

Le site du moulin et l'étendue de l'emplacement sur lequel il était érigé, après avoir été établi d'une manière incontestable comme nous l'allons faire, vont nous mettre sur la voie pour trouver des éclaircissements importants et des résultats cherchés et entrevus. L'endroit se trouve en effet juste à un quart de lieue de la ville, ainsi qu'il a été dit plus haut, et à la jonction des rues St-Jean et d'Aiguillon, sur le coteau Sainte-Geneviève. Ce moulin attenait ci-devant du côté nord-est à une ligne indiquée dans un bail emphytéotique, ci-après mentionné, fait à Louis Manseau, du 12 juin 1790, à prendre à trois pieds de distance du terrain de Nathaniel Taylor. Cette ligne coupe le milieu de la remise ou hangar actuel des chars urbains. Elle est à 145 pieds 8 pouces anglais de distance de la borne actuelle et visible du côté sud-ouest, sur l'alignement nord de la rue St-Jean. Elle court 25° ouest suivant la délimitation du terrain de Manseau décrite dans les titres de la Couronne et d'après les plans des Ingénieurs Royaux.

Ce moulin est indiqué sur la plupart des plans de la bataille, et paraît, quoiqu'un peu trop en arrière, comme en ligne avec le front de bandière de Montcalm et l'Hôpital-Général. Mais, de fait, le plan le plus fiable, celui du cadastre officiel, donne exactement cette ligne à partir de la Côte à Perrault et la tour No 2 à cet hôpital. Il confirme entièrement Hawkins sur ce point. Ce moulin était un moulin à tan mû par le vent, et Johnstone l'a observé comme situé sur la hauteur et près de la cime du coteau Ste-Geneviève. On le retrouve tracé sur le plan de Perrault de 1790, déposé chez les Dames de l'Hôtel-Dieu, et sur lequel il est placé là d'après leurs titres de concession.

En effet, l'emplacement qu'il occupait formait partie des terres environnantes de ces Dames Religieuses et il est enclavé dans le lot No 3755 du cadastre officiel du quartier Saint-Jean et comprend les subdivisions 5 et 6. Il va nous servir pour placer la maison de *Man-*

seau, dans la direction de laquelle et du moulin se trouvait celle de Borgia; et nous verrons que ce n'est pas sans raison qu'en en parlant, les deux maisons de Manseau et de Borgia vont ensemble.

L'Hôtel-Dieu concéda le terrain, non à bail mais en pleine propriété, à Jean-Marie Deguise dit Flamand, marchand-tanneur de Québec, par contrat du 18 août 1752, devant le notaire Saillant; et Flamand le vendit à Louis Manseau, aussi tanneur de Québec, par un acte notarié du 22 juin 1754, devant M^{re} Boucault. Ces titres sont rapportés et confirmés dans le bail emphytéotique pour 99 années par les Religieuses de l'Hôtel-Dieu au même Manseau, père, du 12 juin 1790 ci-dessus, devant M^{re} Descheneaux, notaire, pour un plus grand terrain de 11 arpents, 71 perches et 5 pieds en superficie, qui enclavait son emplacement, et déduction faite de son étendue. Ce bail définit la ligne nord-est de Manseau tel que donnée ci-dessus.

Cet emplacement est dit situé *terrain aux épines* et consistait en 22 toises et demie (135 pieds) de front, borné à l'alignement nord du chemin St-Jean,¹ sur douze toises (72 pieds) de profondeur à angle droit, et borné de tous autres côtés au terrain non concédé; mention est faite au premier contrat d'une maison déjà bâtie par Flamand qui était en possession dès avant l'octroi de son titre.

Manseau demeurait dans cette maison attenante et à côté de son moulin, en 1759.

Car on lit à son sujet, dans le journal du curé Récher,—que Mgr Têtu vient de découvrir et qu'il a en partie publié dans le *Bulletin des Recherches Historiques*, mai 1903, p. 132,—que le curé se retira pendant le siège, le 16 juillet 1759, dans la maison de Pierre Flamand, hors des murailles du faubourg Saint-Jean, et que le 21, il laissa ce quartier à

¹ L'alignement sur la rue St-Jean et le mesurage avaient été donnés par Jansen Lapalme, architecte du Roi et député grand-voyer, par procès-verbal du 12 août 1752, "sur une ligne droite partant vis-à-vis d'une fontaine qui se trouve au milieu du chemin du Roi en descendant au nord-est," c'est-à-dire à environ trois quarts d'arpents sur la rue d'Aiguillon. On peut par ce moyen refaire assez exactement le parcours d'alors du chemin St-Jean à partir de la ville jusqu'à cette fontaine, d'après l'ordonnance du Conseil Souverain du 20 juin 1667, qui la mentionne dans son tracé comme scize sur les terres des Religieuses Hospitalières; et en suivant le tracé du 22 mai 1762 d'après le plan de Levasseur, où l'on y trouve indiqué le cours du chemin passant dans la cour de l'habitation d'Abraham Martin, l'on vient de là droit à la fontaine. On peut ainsi suivre et voir arriver vers le moulin, sur les huit heures, les premières troupes françaises accourant du camp de Beauport et essayant de se former autour du moulin, sur un terrain plein d'épines, inculte et formé de cavées et de crans, pour venir attaquer et rejeter les Anglais de ce poste. Il faut croire que c'était un point stratégique important, puisqu' aussitôt après la bataille Townshend y érigea une redoute montée de deux pièces de canon pour commander le chemin venant de la vallée et canonner les vaisseaux à l'entrée de la rivière St-Charles.

cause des bombes qui passaient sur le faubourg et descendit chez Primaut, tanneur, assez près de l'Hôpital-Général. Ensuite, le dimanche, 12 août, il écrit : " A une heure après minuit, il vient cinq à six bombes " et un pot-à-feu aux environs des tentes de M. de Villars, de Vienne, " Desgranges et , placées au bas du coteau derrière la maison " de Primaut et même plus loin, et *au delà de Manseau, au haut du " coteau*; ce qui nous a fort surpris et nous a fait lever pour aller passer " le reste de la nuit à l'Hôpital-Général." C'est là, évidemment, le " même Manseau.

Et, parlant ensuite de la victoire de Ste-Foy (id., p. 42), il ajoute :

" Les Anglais sont entrés dans la ville et les Français sont restés " ayant dix pièces de canon avec eux *vers les maisons de Borgia et " Manseau.*"

Ce qui revient à dire—quand on connaît le résultat de la journée, à savoir, la déroute complète et la fuite désordonnée des troupes anglaises, en abandonnant leurs vingt-deux pièces de canon sur le champ de bataille—que les Français n'ont pas poussé plus loin de ce côté leur poursuite et ont ramené jusque-là dix des pièces enlevées à l'ennemi.

Il semble donc raisonnable de voir ces deux maisons de Borgia et de Manseau comme ayant existé assez près l'une de l'autre et dans tous les cas dans une même direction sur le chemin Saint-Jean, vers le moulin et tout auprès.

En effet, le mouvement stratégique de Wolfe, dans la direction du moulin et de la maison de Borgia, sur le bord de la hauteur, si bien défini par Johnstone, " towards the wind-mill and Borgia's house upon " the edge of the hill," nous semble clairement indiquer que ces deux maisons doivent être dans une seule et même direction, droit vers le moulin, direction pour atteindre le même but, c'est-à-dire la tentative d'une descente de là par le chemin allant droit au pont de bateaux, pour couper en deux l'armée française. La maison de Manseau doit être une des deux incendiées, et l'autre serait celle de Borgia, sur laquelle l'aîle gauche de Wolfe s'était appuyée dès le commencement, et dont la garnison fut rejetée et les troupes expulsées furent forcées à reprendre leur première position.

Si l'on fait attention qu'ensuite les trente hommes du La Sarre se sont avancés au delà de la fumée de cette dernière comme de celle de l'autre pour observer l'ennemi, on peut en déduire encore, vu le peu d'espace entre les deux lignes de bataille, que la distance de celle-ci à l'autre et au moulin ne peut être considérable, et que cette maison doit se trouver dans ces environs et proche, puisque la fumée des deux formait un voile sans laisser apparemment une éclaircie entre elles.

Nous ne pouvons sur ces données établir au juste cette faible distance, laquelle le curé Récher semble effacer en les mettant presque ensemble.

Dans tous les cas, nous avons la certitude historique de l'incendie de *deux maisons* situées en avant de la ligne de Wolfe et près du moulin, et de l'incendie nominément de la maison de Borgia, laquelle semble une des deux. Nous avons aussi une même direction de celle-ci vers le moulin à vent de Manseau, à côté duquel il était logé, ce qui établit des présomptions plus que suffisantes pour dire que ces deux maisons ne pouvaient guère être éloignées l'une de l'autre.

Nous devons cependant ajouter que, malgré toutes nos recherches faites avec la plus grande obligeance de la part des Dames Religieuses de l'Hôtel-Dieu, et particulièrement de leur annaliste, qui connaît à fond l'histoire de Québec et de toute la localité, laquelle forme partie de leurs terrains, nous n'avons pu constater par leurs archives jusqu'à présent, d'autre nom comme propriétaire dans l'endroit que celui du nommé Manseau, et pas d'autre habitation là avant 1759. La raison en est simple: elles n'avaient pas fait d'autres concessions en ces endroits avant cette date.

Cependant, on devrait parvenir à y localiser cette autre deuxième maison, soit de Borgia, ou d'un autre, puisqu'il y en avait certainement deux là, et conséquemment, il doit exister un titre de la propriété pour le maître à qui elle appartenait.

A défaut de l'Hôtel-Dieu, on pourrait se replier sur le terrain de Manseau qui possédait le domaine absolu du fond de son emplacement, lequel était suffisamment étendu pour y ériger une deuxième maison, que Borgia, maître-menuisier de son état, aurait bien pu y avoir construit, soit pour lui-même, soit pour un de ses fils, ou encore pour sa fille qui fut mariée à Manseau, fils, peu après.

Cette conjecture venait se confirmer à point par l'examen du plan de Holland de 1785, où l'on voit deux maisons distinctes auprès du moulin Manseau, lesquelles auraient été rebâties sur les mêmes fondements et dans les limites de son terrain qui y sont marquées. De plus, elles correspondent avec la même direction vers le moulin que nous avons reconnue.

D'autres circonstances nous portent à grouper ensemble et comme voisines les familles Borgia et Manseau, à cause de diverses alliances entr'elles qui s'en suivirent. Ainsi, comme l'a noté Mgr Têtu (*Id.*, p. 42), Jean-Bte Manseau, fils, né le 20 mars 1747, épousa Marie-Jeanne Levasseur dit Borgia, née en 1745 et fille de notre Borgia; on sait, de plus, qu'ensuite, Philippe-Augustin Levasseur dit Borgia, son fils, né en 1749, fut marié à Marguerite Manseau; et que Nicolas Levasseur dit Borgia un autre fils, né vers 1744, épousa la sœur de celle-ci, Angélique Manseau, et l'on découvre par le rôle de milice de 1776 qu'il était tanneur, comme son beau-père, et il avait quinze ans et demi en 1759 et d'âge à être apprenti.

Nous en étions là dans nos vaines recherches commencées depuis longtemps (1889) pour localiser sûrement le site de la maison de Borgia, après avoir compulsé soigneusement les archives de l'Hôtel-Dieu, qui sont la véritable et unique source d'où découle le titre à la propriété de Manseau et des environs; mais, comme elles étaient restées infructueuses, nous ne savions plus de quel autre côté nous adresser, quand les récentes données fournies par le *Journal du Curé Récher* ont réveillé notre attention comme un jet de lumière. Nous avons fait de nouvelles tentatives pour trouver le titre actuel à la propriété Manseau, afin de remonter jusqu'à lui, en vue d'y découvrir là, peut-être, cette maison de Borgia, et pour apprendre en même temps par quel chaînon de pièces authentiques le fond de l'emplacement de Manseau, autrefois complètement aliéné par l'Hôtel-Dieu, a pu lui revenir en pleine propriété, comme en fait foi aujourd'hui le cadastre officiel dûment corrigé et finalement déterminé, suivant le plan du lot No 3755, 5 et 6, qu'on y voit.

Les Manseau sont demeurés propriétaires de leur acquisition du 22 juin 1754 et de leur emphytéose du 12 juin 1790 jusqu'au 30 novembre de cette année 1790. Leur voisin, Nathaniel Taylor, occupait le terrain du côté nord-est aussi par bail emphytéotique pour 99 années, suivant contrat que lui avait consenti l'Hôtel-Dieu devant M^{re} Descheneaux, notaire, le 31 mai aussi 1790. Il voulut acquérir des Manseau tant le fond de leur emplacement que leur droit d'emphytéose à courir jusqu'au 1^{er} mai 1889, pour adjoindre le tout à son propre bail.

Or, c'est par la vente consentie à Taylor que nous sommes parvenus à retrouver Borgia, du moins son nom, dans la personne de deux de ses fils et de sa fille Marie-Jeanne, comme co-propriétaires chacun d'un septième dans la moitié indivise de l'emplacement Manseau, comme aussi dans *deux maisons* dessus construites et possédées en commun.

En effet, les vendeurs y sont désignés comme suit à l'acte du 30 novembre 1790, devant le même notaire Descheneaux:—

“Louis Manseau, père, Jean-Baptiste Manseau, Joseph Manseau, Augustin Borgia-Levasseur et Dame Marguerite Manseau, son épouse, Nicolas Borgia-Levasseur et Dame Angélique Manseau, son épouse, tous aussi au nom de Joseph Paquet, de Montréal, et Joseph Manseau, son épouse, leurs gendres et filles, sœurs et beaux-frères; encore Louis-Joseph Joubert, fils unique, seul héritier de défunt Jean Joubert, vivant, tanneur, et d'Elizabeth Manseau, absent de cette province, pour lequel les vendeurs se portent forts.”

Lesquels vendent à Taylor “un terrain situé en la banlieue de cette ville, à l'extrémité du faubourg Saint-Jean, contenant trois quarts d'arpent de front sur soixante-douze pieds de profondeur, formant un carré long, borné par devant au chemin St-Jean;” et ensemble *deux*

maisons construites en bois sur le susdit terrain; encore les instruments, cuves en cuivre et bois propres à la tannerie et qui sont actuellement dans une des dites maisons; lequel terrain est dit provenir des titres cités ci-dessus à commencer par celui de Deguise dit Flamand en 1752.

Cf. Papier Terrier, Vol. B, Domination Anglaise, pp. 12-13, Domaine du Roy.

Taylor se trouvait ainsi à posséder une étendue notable du coteau Ste-Geneviève depuis sa cime jusqu'au chemin Saint-Jean, et les autorités militaires qui y avaient déjà commencé la tour Martello No 4, vers 1805, derrière le terrain de Manseau, le point stratégique ci-haut mentionné, jugèrent nécessaire d'en faire l'acquisition pour la défense de la ville. Alors, Lord Dalhousie, gouverneur, intervint en personne, au nom de Sa Majesté, à l'acte à cette fin, que Montizambert et les représentants et ayants-cause de Taylor lui consentirent par cession de tous leurs droits, devant Mtre Arch. Campbell, notaire, le 31 mai 1822.

Depuis cette date jusqu'à l'expiration du bail, au 1er mai 1899, le gouvernement militaire demeura en possession; alors qu'il la délaissa par abandon pur et simple à l'Hôtel-Dieu.

Pendant son occupation le gouvernement militaire avait posé des bornes pour délimiter dès 1822 son terrain et particulièrement l'emplacement Manseau, sur lequel il en existe encore deux sur la ligne ouest. Elles sont en pierre et plantées hors de terre avec la marque officielle B. O. du *Boundary Ordnance*; l'une, est sur l'alignement du chemin Saint-Jean et l'autre vis-à-vis sur la profondeur du lot. Elles correspondent avec les mêmes terrain, maisons et moulin indiqués sur le plan du major Holland de 1785.

Cette propriété est mentionnée dans la liste de celles du Département de la guerre transférées au gouvernement fédéral en 1867.

La Compagnie (ci-devant) du Chemin de fer urbain de la rue Saint-Jean acquit ce terrain du gouvernement fédéral par lettres patentes du 2 novembre 1878, et par un échange avec elle du 5 juin 1889, Labrèque, notaire, l'Hôtel-Dieu rentra dans le domaine de son ancienne propriété vendue à Flamand en 1752, et en a disposé depuis en conséquence. Elle appartient aujourd'hui à la *Cie Q. R. L. & Power Co. of Montmorency*.

Il y avait encore lors de cet échange deux maisons dessus qui existaient depuis longtemps et durant, sinon avant, l'occupation du Département de la guerre. L'une, du côté ouest, se voit encore assise sur de vieilles fondations; l'autre a fait place à la remise actuelle des chars Urbains. Chacune occupait respectivement le site primitif des deux maisons des Manseau et des Borgia, indiquées en 1785 et vendues en 1790, comme dit plus haut. Elles pourraient fort bien être les mêmes que celles rebâties après la conquête.

De plus, et chose importante à noter, c'est que lors et antérieurement au bail fait à Manseau, et à celui fait aussi en 1790 à Wm Grant, d'un lot plus loin, lesquels baux comprenaient toute l'étendue du terrain du côté nord-ouest du chemin Saint-Jean, depuis le moulin à vent jusqu'à la rue et Côte Sauvageau, plus de huit arpents de front (plan Perrault et celui d'Adams), il n'y avait pas de maisons, car ces baux donnaient une superficie nue partout et un simple terrain en pacage. En fait il n'y avait pas eu de concessions là avant 1759, sauf celle à Deguise. Il n'en existait pas non plus au delà et jusqu'à la borne des Ursulines qui suit la ligne nord-est du terrain de l'asyle Findlay et les sépare de l'Hôtel-Dieu.

Et du côté sud du chemin il n'y en avait pas non plus sur un espace de 7 arpents, 6 perches et 6 pieds, à partir de la rue Claire-Fontaine, comme on le voit par le bail emphytéotique à David Lynd en cette même année, 22 juin 1790, et au delà, pas eu encore de concessions avant 1759.

Conséquemment, en 1759, on ne pouvait apercevoir dans la direction et près du moulin que les deux maisons de Borgia et Manseau, en avant de la ligne anglaise, puisqu'il n'y en avait pas d'autres et que les deux lignes de bataille n'étaient pas espacées de plus de huit arpents à partir du moulin.

Or, si la maison de Borgia a été de fait incendiée avec une autre auprès, comme le rapportent les historiens des deux côtés, anglais comme français, ce que nous ne pouvons refuser de croire comme vrai, il est certain que ce n'est pas celle au pied de l'Avenue-des-Érables à laquelle les combattants auraient mis le feu pour la détruire comme poste avancé. Cette dernière n'a pas été incendiée, et si toutefois elle existait et appartenait à Borgia (ce qui reste à prouver), elle était derrière la ligne anglaise et ne pourrait être celle en avant.

Laissant de côté la maison de Ste-Foy, nous croyons donc que l'indication donnée et entendue par le Curé Récher de l'endroit des maisons de Borgia et Manseau, vers lesquelles les Français sont restés avec dix pièces de canon, doit être acceptée comme la meilleure connue et prouvée, vu qu'on n'en connaît pas d'autre vers cet endroit, où il y en avait une indubitablement connue sous le nom de Borgia.

Suivant nous c'est la maison indiquée près du moulin sur le fameux plan colorié, *The Siege of Quebec, vol. I., p. 264*, laquelle se trouverait, d'après son échelle, sur le côté ouest de l'emplacement de Manseau, et près de son moulin à tan. C'est la seule maison y marquée et en avant de la ligne anglaise; et nous avons démontré qu'il n'y avait pas d'autre, sauf celle de Manseau attenant au moulin.

Le même moulin est marqué sur le plan, *vol. II, p. 272*, montrant aussi divers peletons de troupes françaises en avant et aux alentours; ce qui impliquerait l'occupation déjà prise par elles de ce poste. On

y voit aussi le chemin descendant droit au pont de bateaux, celui pour lequel les anglais tentèrent vainement leur attaque pour opérer une descente à ce pont.

Au regard des étrangers, ces recherches peuvent paraître minutieuses pour établir un point historique dont l'importance devient comparativement minime en vue du résultat général de la bataille et des immenses conséquences qui en sont découlées.

Toutefois, nous, gens du pays, de même que les lecteurs studieux et attentifs, aimons à trouver une exactitude incontestable dans le développement des détails historiques concernant les Plaines d'Abraham, du moment qu'ils méritent d'être mis au jour. Et certainement que l'endroit du poste en avant, pris et fortifié par Wolfe pour y appuyer son aile gauche, devrait être connu et fixé d'une manière irréfragable.

V.—*Le Haut-Canada avant 1615.*

Par M. BENJAMIN SULTE.

(Lu le 21 juin 1904.)

La légende qui s'est formée autour de Verrazano et qui paraissait devoir passer à l'état d'article de foi, tout en étant mise en doute par plusieurs, est détruite depuis quatre ans, grâce aux travaux éclairés de Gabriel Gravier, de Rouen, et d'Eugène Guénin, de Paris, qui ont mis au jour une foule de documents officiels concernant le corsaire Jean Fleury.

Ce dernier avait été confondu avec Verrazano parce que, le plus souvent, on l'appelait Florin et que l'on désignait communément Verrazano sous le nom de Florentin, vu qu'il était natif de Florence. Tous deux ont été au service de Jean Ango, de Dieppe, le plus grand armateur de France à cette époque.

Par ordre de François Ier, Jean Verrazano partit à la fin de l'année 1523, pour aller en découverte, disant qu'il devait exister un détroit au nord, comme Magellan en avait trouvé un au sud, et il ajoutait : " Je pense bien rencontrer l'obstacle des terres nouvelles, mais j'arriverai à quelque passage qui m'ouvrira l'océan et la route de l'Asie ".

Dans ce voyage mémorable, il reconnut la côte de l'Amérique depuis la Caroline du Nord jusqu'à Terre-Neuve, y planta les enseignes et armoiries de France et nomma toute cette vaste région la Nouvelle-France, ⁽¹⁾ nom qui fut immédiatement adopté par les Espagnols et les Portugais, ce qui est de toute importance. Le 8 juillet 1524, il était de retour à Dieppe et écrivait son rapport au roi.

Tandis que Verrazano se dirigeait ainsi vers l'Amérique, Jean Fleury capturait un navire portugais revenant des Indes avec un chargement évalué à 180,000 ducats. Au mois de mars 1524, sur la route des Canaries, il s'empare d'un navire chargé de diverses marchandises appartenant à Vincente Fernando, Espagnol ; au mois d'août, même année, il prend et pille, au cap Saint-Vincent, côte d'Afrique, plusieurs navires appartenant à Fernando Vallascie ; en septembre suivant, il pille et coule à fond, aux îles du cap Vert, un navire commandé par Johannes Viegas. Enfin, au mois d'octobre 1526, il est capturé, dans le golfe de Biscaye, et pendu en Espagne par ordre de Charles-Quint.

(1) Voir Dionne : *La Nouvelle-France*, 217-8, 252 ; *Bulletin des Recherches*, 1895, p. 133.

Jean Verrazano repartit de Dieppe avec les instructions de François 1^{er}, le 17 mars 1528, et visita la Floride, où il fut tué par les Sauvages.

Le voyage de 1524 est donc le seul qui nous renseigne sur les découvertes de l'envoyé français. Elles consistaient en ceci : de la Caroline au Maine, il ne se rencontre pas de fleuve assez considérable pour indiquer une grande profondeur de terre. Les Sauvages font comprendre qu'il y a des montagnes d'où sortent ces petits fleuves et que plus loin il y a des nappes d'eau sans fin : nos grands lacs.

Verrazano croyait que les terres entrevues sur son chemin n'étaient qu'un mince barrage, de sorte qu'il localisait le Pacifique à l'endroit où sont les lacs Ontario et Erié.

Cartier, dix ans plus tard, cherchait la "mer de Verrazano" lorsqu'il eut connaissance du Saint-Laurent. Il annonça, par conséquent, que la théorie de son prédécesseur était fausse, puisque le continent se prolongeait indéfiniment à l'ouest. Voici des passages de sa narration qui disent ce qu'il apprit étant à Montréal :

" Nous voyons ledit fleuve outre le lieu (le Pied du Courant) où étaient demeurées nos barques, auquel va un saut d'eau (Saut Saint-Louis) le plus impétueux qu'il est possible de voir, lequel ne nous fut possible passer... et nous fut dit par signes qu'il y avait trois tels sauts d'eau audit fleuve (Cascades, Cèdres, etc.) comme celui où étaient nos dites barques, mais nous ne pûmes entendre quelle distance il y avait entre l'un et l'autre, par faute de langue : puis nous montrèrent par signes que, lesdits sauts passés, l'on pouvait naviguer plus de trois lieues par ledit fleuve..."

Cette géographie ne va pas plus loin que les comtés de Soulanges et Beauharnois.

Du côté de la rivière Ottawa, on voit que Cartier s'est enquis minutieusement : "ladite rivière entre en deux ou trois grands lacs d'eau, puis on trouve une mer douce, de laquelle n'est mention avoir vu le bout". Il croit comprendre que, dans cette direction, il y a des villes et des gens vêtus à la mode européenne.

Quelque temps après, les Sauvages de Québec lui dirent que, à partir de Montréal, "y a une rivière qui va vers le Surouaist, ou semblablement sont une lune à aller jusqu'à une terre où il y a jamais de glaces, ni neiges, mais que, en cette dite terre, y a guerres continuelles les uns avec les autres. Et que, en icelle terre, y a oranges, amandes, noix, pommes et autres sortes de fruits et en grande abondance".

Voilà tout ce que le Découvreur avait pu apprendre. Cela ne justifie personne de dire qu'il a connu l'existence du lac Ontario et de la chute du Niagara.

La carte dressée par Pierre Desceliers en 1546, à Arques, près de Dieppe, montre les rivages de la mer depuis la Floride jusqu'au Labrador, et le fleuve Saint-Laurent jusqu'à Montréal, mais rien des grands lacs. Les renseignements géographiques obtenus par Cartier ne dépassaient guère l'île de Montréal.

De 1545 à 1557, date de sa mort, le Découvreur ne paraît pas s'être occupé de la Nouvelle-France, ni personne dans le royaume, sauf, vers la fin du siècle, les Noël, neveux de Cartier, qui fréquentaient le Saint-Laurent pour se procurer des pelleteries. L'un de ces derniers, Jacques Noël, se rendit à Montréal en 1583.

Les lettres suivantes témoignent de la persévérance que mettait cette famille à s'occuper du Canada. Le texte original ne nous en est pas connu; ce qui suit est une traduction de l'anglais de Hakluyt:

"A monsieur Jean Growte, étudiant à Paris. — Votre beau-frère, M. Gilles Watier, m'a montré, ce matin, une carte publiée à Paris, dédiée à un nommé M. Hakluyt¹ gentilhomme anglais, dans laquelle toutes les îles occidentales, le royaume du Nouveau-Mexique et les pays de Canada, Hochelaga et Saguenay se trouvent compris. Je maintiens que la rivière du Canada, qui est décrite dans cette carte, n'y est pas placée comme elle se trouve dans mon livre, lequel est conforme à celui² de Jacques Cartier, et que ladite carte ne place pas le grand lac³ qui est au-dessus des sauts en la façon que les Sauvages qui demeurent auxdits sauts nous en ont donné connaissance. Dans la susdite carte que vous m'avez envoyée, le grand lac se trouve placé trop au nord. Les sauts ou chutes d'eau sont par le 44^e⁴ degré de latitude, et il n'est pas si difficile de les passer qu'on l'imagine. Les eaux ne tombent pas d'aucunes hauteurs bien considérables; ce n'est qu'au milieu de la rivière où il y a mauvais fond. Il serait préférable de construire des barres au-dessus des sauts: et il est facile de marcher par terre jusqu'à la fin de trois sauts; il n'y a pas plus de cinq lieues de marche.⁵ J'ai été sur le haut d'une montagne⁶ qui est au pied desdits sauts, d'où j'ai pu voir ladite rivière au delà desdits sauts, laquelle se montre là plus large⁷ qu'elle n'est à l'endroit où nous l'avons passée. Par le

¹ Richard Hakluyt, d'Oxford, collectionneur célèbre, séjourna en France, de 1584 à 1588.

² Ce livre ou mémoire de Cartier est perdu.

³ Ce devait être l'Ontario.

⁴ Ils sont presque un degré et demi plus au nord.

⁵ Le lac Saint-Louis, qui baigne d'un côté l'île de Montréal, a cinq lieues de longueur; ensuite viennent les Cascades, les Cèdres et les rapides du Côteau-du-Lac, en tout cinq ou six lieues, puis le lac Saint-François, qui compte douze lieues de long.

⁶ La Montagne de Montréal.

⁷ Le lac Saint-Louis.

peuple du pays nous a été dit qu'il y avait dix journées de marche depuis les sauts jusqu'à ce grand lac, mais nous ne savons pas combien de lieues ils comptent par journée.¹ Je ne puis, pour le moment, vous en écrire plus long, car le courrier ne peut demeurer plus longtemps. Je terminerai donc, pour le présent, en vous présentant mes meilleurs saluts, priant Dieu de vous accorder l'accomplissement de vos désirs. Votre ami affectionné, Jacques Noël. De Saint-Malo, avec hâte, ce 19 juin 1587."

Une autre lettre, du même au même, mentionne "les écrits de feu mon oncle le capitaine Jacques Cartier", et un "certain livre fait en manière d'une carte marine, laquelle a été rédigée² de la propre main de mon oncle susdit.

"J'ai trouvé dans ladite carte, au-dessus de l'endroit où la rivière se partage en deux,³ au milieu des deux branches de ladite rivière et quelque peu plus proche de la branche qui court vers le nord-ouest, les mots qui suivent, écrits de la main de Jacques Cartier: "Par le peuple du Canada⁴ et Hochelaga, il est dit que c'est ici la terre du Saguenay, laquelle est riche et abonde en pierres précieuses." Et, à environ cent lieues de cet endroit j'ai trouvé les deux lignes suivantes écrites sur ladite carte, dans la direction du sud-ouest: "Ici, dans ce pays, se trouve la cannelle et la girofle que dans leur langue ils appellent "Canodetta". Pour ce qui est de mon livre (ci-dessus) dont je vous ai parlé, il est fait en la forme d'une carte marine, et je l'ai remis à mes deux fils, Michel et Jean, qui présentement sont en Canada. Si à leur retour, qui sera, avec la volonté de Dieu, vers la Sainte-Madeleine (22 juillet) prochaine, ils ont appris quelque chose qui vaille la peine d'être rapporté, je ne manquerai pas de vous le faire savoir."

Nous ne connaissons rien de plus sur ce sujet.

Dans la carte de Molineau, qui est de 1600, on voit la rivière Ottawa (sans nom), l'île de Montréal et le haut du fleuve Saint-Laurent, au delà des Cascades jusqu'à un vaste lac appelé "Tadenac", à l'endroit du lac Ontario, mais il n'y a rien de plus dans cette direction. Les Noël savaient cela.

* * *

¹ De Montréal à Kingston, il y a cinquante-sept lieues.

² Ces ouvrages de Cartier sont perdus.

³ Un siècle plus tard, on parlait encore de l'Ottawa comme d'une branche du Saint-Laurent, quoique l'on connût très bien que cette rivière était un tributaire du fleuve.

⁴ Ceci veut dire Stadaconé ou ville de Québec à présent, car cette région était tout le Canada d'alors.

Durant sa première visite à Montréal, l'été de 1603, Samuel de Champlain prit note de ce que lui disaient les Sauvages au sujet des régions de l'ouest et du sud. Voici tout ce qu'il connaît de l'Ottawa :

“ Il y a une rivière qui va en la demeure des Algonmequins, qui sont à quelque soixante lieues éloignés de la grande rivière.”

Ses renseignements de ce côté ne vont pas plus loin ; sur le cours du Saint-Laurent au-dessus du lac Saint-Louis, les Sauvages sont plus communicatifs :

“ Ils passent cinq sauts (Cascades, Cèdres, Côteau-du-Lac) lesquels peuvent contenir, du premier au dernier, huit lieues, desquels il y en a deux où ils portent leurs canots pour les passer. Chaque saut peut tenir quelque demi quart de lieue, ou un quart au plus ; et puis ils viennent dedans un lac (Saint-François) qui peut tenir quelques quinze ou seize lieues de long. De là, ils rentrent dans une rivière (le Long-Saut) qui peut contenir une lieue de large, et font quelques lieues dedans, et puis rentrent dans un autre lac de quelques quatre ou cinq lieues de long. Venant au bout duquel ils passent cinq autres sauts, distants du premier au dernier quelques vingt-cinq ou trente lieues, dont il y en a trois où ils portent leurs canots pour les passer, et les deux autres ils ne les font que traîner dedans l'eau, d'autant que le cours n'y est si fort ni mauvais comme aux autres. De tous ces sauts, aucun n'est si difficile à passer comme celui que nous avons vu (le saut Saint-Louis de Montréal). Et puis ils viennent dedans un lac (Ontario) qui peut tenir quelques quatre-vingts lieues de long, où il y a quantité d'îles (les Mille-Iles), et que au bout d'icelui l'eau y est salubre et l'hiver doux. A la fin du dit lac ils passent un saut¹ qui est quelque peu élevé, où il y a peu d'eau, laquelle descend.² Là ils portent leurs canots par terre environ un quart de lieue pour passer ce saut ; de là entrent dedans un autre lac (Erié) qui peut tenir quelques soixante lieues de long, et que l'eau en est fort salubre. Etant à la fin, ils viennent à un endroit (le Détroit aujourd'hui) qui contient deux lieues de large et va assez avant dans les terres. Ils disent qu'ils n'avaient pas passé plus outre et n'avaient vu la fin d'un lac (Huron) qui est à quelques quinze ou seize lieues d'où ils ont été ; ni que ceux qui leur avaient dit eussent vu homme qui l'eût vu ; d'autant qu'il est si grand qu'ils ne se hasarderont pas de se mettre au large, de peur que quelque tourmente ou coup de vent ne les surprît. Ils disent qu'en été le soleil se couche au nord du dit lac, et en hiver il se couche comme au milieu ; que l'eau y est très mauvaise, comme celle de cette mer.³ Je leur demandis si depuis ce dit

¹ Le Niagara. C'est la première fois que cette merveille de la nature est mentionnée dans l'Histoire.

² Il devait y avoir sur le manuscrit “ descend à pic ”.

³ Quelle mer ?

lac dernier qu'ils avaient vu si l'eau descendait toujours dans la rivière (le Saint-Laurent) venant à Gaschepay (Gaspé); ils me dirent que non; que depuis le troisième lac elle descendait seulement venant au dit Gaschepay ⁽¹⁾ mais que depuis le dernier saut (Niagara) qui est quelque peu haut, comme j'ai dit, que l'eau était presque pacifique, et que ledit lac pouvait prendre cours par d'autres rivières, lesquelles vont dedans les terres, soit au sud ou au nord, dont il y en a quantité qui y refluent et dont ils ne voyent pas la fin. Or, à mon jugement, il faudrait que si tant de rivières débordent dedans ce lac, ni ayant que si peu de cours au saut, qu'il faut par nécessité qu'il reflue dedans quelque grandissime rivière. Mais ce qui me fait croire qu'il n'y a point de rivière par où cedit lac reflue, vu le nombre de toutes les autres rivières qui refluent dedans, c'est que les Sauvages n'ont vu aucune rivière qui prend son cours par dedans les terres, qu'au lieu où ils ont été: ce qui me fait croire que (le lac Huron) c'est la mer du sud, étant salée comme ils disent. Toutefois, il n'y faut pas tant ajouter de foi, que ce soit avec raisons apparentes, bien qu'il y en ait quelque peu."

Quelques jours plus tard il consulta des Sauvages de l'île d'Orléans: "Ils dirent, comme ils l'ont figuré, que, passé le saut que nous avons vu (à Montréal) environ deux ou trois lieues, il y a une rivière en leur demeure, qui est en la bande du nord, continuant le chemin dans la dite grande rivière (le Saint-Laurent) ils passent un saut, où ils portent leurs canots, et viennent à passer cinq autres sauts, lesquels peuvent contenir du premier au dernier quelques neuf ou dix lieues; et que les dits sauts ne sont point difficiles à passer, et ne font que traîner leurs canots en la plupart des dits sauts, hormis à deux, où ils les portent. De là, viennent à entrer dedans une rivière qui est comme une manière de lac (Saint-François) laquelle peut contenir comme six ou sept lieues; et puis passent cinq autres sauts où ils traînent leurs canots comme aux dits premiers, hormis à deux où ils les portent comme aux premiers; et que, du premier au dernier, il y a quelques vingt ou vingt-cinq lieues. Puis viennent dedans un lac (l'Ontario) qui contient quelque cent cinquante lieues de long; et, quelques quatre ou cinq lieues à l'entrée du dit lac, il y a une rivière ² qui va aux Algoumequins vers le nord, et une autre (la rivière Noire) qui va aux Irocois; par où lesdits Algoumequins et Irocois se font la guerre. Et un peu plus haut, à la bande du sud dudit lac, il y a une autre rivière (Oswego) qui va aux Irocois;

¹ En micmac, ce terme signifie langue de terre. (Note de F. J. Audet).

² La rivière Trent. Sur la carte de 1612, Champlain indique ce cours d'eau et trace, sans trop de précision, la baie de Quinté avec une assez vaste péninsule. Un village marqué Ganontha hongnón est à travers l'isthme au-dessus du canal Murray actuel.

puis venant à la fin dudit lac, ils rencontrent un autre saut où ils portent leurs canots.”

Le lecteur se rend compte de toute cette description, sauf des eaux salées du lac Huron, mais cette fausse donnée se rapporte peut-être au nom des Ouinipegouek, de la baie Verte du lac Michigan, autrement dit Gens de Mer, Gens des Eaux Salés ou nation des Puants, que certaines tribus du Haut-Canada connaissaient. En tous cas, la fausse notion de l'existence d'une mer salée en cet endroit se retrouve dans les cartes de Sanson (1650-1667) où le lac Sainte-Claire est désigné : “lac des Eaux Salées”. En 1669, Dollier et Galinée réglèrent la question.

* * *

Tâcher de faire le tour du monde en aussi peu de temps que possible et par les voies les plus directes—telle a été la cause de la découverte du Canada. On s'est arrêté en route pour fonder des colonies, voyant que l'Amérique ne se laissait pas traverser comme une vulgaire province d'Europe. Le Canada a été une sorte de pied-à-terre, durant trois cent cinquante ans, en attendant les communications avec le Pacifique.

L'automne de 1535, Cartier contemplant les terres de l'Ouest du haut de la montagne de Montréal, rêvait de les parcourir pour atteindre la Chine. L'automne de 1885—trois cent cinquante ans après—le premier convoi du chemin de fer du Pacifique Canadien se rendait d'un océan à l'autre. Ainsi vont les choses humaines. Nous sommes tellement faibles que nous prenons des siècles pour exécuter les œuvres les plus simples.

Un poète, qui signe Motin, écrivait, en 1604, une pièce de vers en l'honneur de Champlain, dans laquelle il disait :

Que désires-tu voir encore,
Curieuse témérité?
Tu connais l'un et l'autre More,
Et ton cours est-il limité?
En quelle côte reculée
N'est-tu pas, sans frayeur, allée
Et ne sers-tu pas de raison
Que l'âme est un feu qui nous pousse
Qui nous agite et se courrouse
D'être en ce corps comme en prison!

Quels honneurs et quelles louanges
Champlain ne doit point espérer,
Qui, de ces grands pays étranges
Nous a su le plan figurer!

Ces vers, d'une facture assez banale, montrent cependant que les voyages de Champlain avaient fait de lui le Livingston et le Stanley de son temps. On s'émerveillait en apprenant ce que renferme le continent mystérieux de l'ouest.

Traditionnellement, les peuples du bassin de la Méditerranée ont cherché à résoudre le problème des sources du Nil. Champlain retrouva une question semblable dans le fleuve Saint-Laurent. Il eut sans doute tenté de l'éclaircir si les circonstances lui eussent permis de revenir au Canada en 1604, mais le projet de la colonisation de l'Acadie l'entraîna de ce côté. Etant donc à Port-Royal, il connut Marc Lescarbot et trouva dans cet esprit cultivé un compagnon capable de le comprendre. Lescarbot écrivit un sonnet dans lequel il exprime très bien la pensée de Champlain :

Un roi numidien, poussé d'un beau désir,
Fit jadis rechercher les sources de ce fleuve
Qui le peuple d'Egypte et de Libye abreuve,
Prenant en son pourtrait son unique plaisir.

Champlain, ja de longtemps, je vois que ton loisir
S'emploie obstinément et sans aucune treuve
A rechercher les flots qui, de la terre neuve
Viennent, après maints sauts, les rivages saisir.

Que si tu viens à chef de ta belle entreprise
On ne peut estimer, combien de gloire, un jour
Acquerras à ton nom, que dès ja chacun prise.

Car d'un fleuve infini tu cherches l'origine
Afin qu'à l'avenir y faisant ton séjour
Tu nous fasse par là parvenir à la Chine.

Et, toujours à la suite de ses conversations avec Champlain, ce bon Lescarbot écrivait, en prose : " La grande rivière de Canada prend son origine de l'un des lacs qui se rencontrent au fil de son cours, si bien qu'elle a deux cours : l'un en orient, vers la France, l'autre en occident, vers la mer du sud. Le sieur de Champlain nous promet de ne cesser jamais qu'il n'ait pénétré jusqu'à la mer occidentale, ou celle du nord, pour ouvrir le chemin de la Chine, en vain par tant de gens recherché. Quant à la mer occidentale, je crois qu'au bout du grandissime lac (Huron) qui est bien loin outre celui (Ontario) dont nous parlons, il se trouvera quelque grande rivière laquelle se déchargera dans icelui, ou en sortira (comme celle de Canada) pour s'aller rendre en icelle mer." Lescarbot se rappelait Hérodote qui, après avoir constaté la parfaite ignorance où l'on était concernant les sources du Nil, rencontra un homme très affirmatif dans l'explication qu'il en donnait : " Ce fleuve, di-

sait-il, a deux issues, l'une au nord en Egypte, l'autre au sud en Ethiopie."

* * *

Le globe terrestre fut, à l'origine, une masse couverte par les eaux. Lorsque les feux intérieurs soulevèrent les montagnes et certains plateaux de terrains au-dessus du niveau de cette mer universelle, montagnes et côteaux apparurent comme autant d'îles perdues dans ces vastes espaces. Plus tard, les soulèvements se répétèrent et, de place en place, les hauteurs finirent par se rapprocher, se joindre, se souder ça et là, de manière à former des chaînes d'éminences, des montagnes, puis des continents, mais les eaux dominaient encore dans une proportion quintuple à la surface de toute la sphère. L'aspect général était celui de larges flaques d'eau entrecoupées de pics et de plaines sèches. Petit à petit, les exhaussements ne cessant de se produire, les terres devinrent nombreuses au soleil et habitables. L'innombrable quantité de lacs qui constellaient la boule ou globe terrestre se mirent à couler dans le sens des pentes, à mesure que les secousses des feux volcaniques créaient des inégalités, des bas-fonds et des élévations tout autour de leurs rives. De ces mouvements sont nés les fleuves et les rivières. Dans certaines parties du monde ces transformations se sont produites, sinon avec rapidité, du moins plus vite que les autres. Il y a trois mille ans que les derniers vestiges de l'époque lacustre sont disparus de la France, tandis que tout le nord du Canada en est encore couvert aujourd'hui, sans compter les lacs Supérieur, Michigan, Huron, Erié, Ontario, Champlain, Saint-François et Saint-Pierre, qui représentent toujours les âges primitifs, et auxquels il faudra des milliers d'années pour s'assécher de manière à creuser le fleuve Saint-Laurent jusqu'à ses sources.

"Il faut remarquer que la partie boréale de l'Amérique du Nord qui s'est débarrassée des glaces est encore dans la période lacustre qui suivit les âges glaciaires. Ces lacs ont déjà notablement diminué mais en plusieurs districts, leurs bizarres labyrinthes occupent encore plus de la moitié du territoire; les rivières n'ont point régularisé leurs cours comme celles de la zone tempérée en Europe et en Amérique, mais, comme les courants scandinaves et finlandais, ce sont des enchaînements de lacs irréguliers, unis les uns aux autres par des échelons de rapides, des sauts, des cataractes, des "chaudières." A cet égard, le Canada est la région la plus curieuse du monde entier; même ses plus grands fleuves, encore jeunes dans l'histoire de la Terre, sont interrompus par de formidables chutes." ¹

¹ Elisée Reclus: *Géographie Universelle*, XIV. 55, 426.

Le Saint-Laurent est un estuaire ou golfe depuis Gaspé jusqu'à Québec, où finit l'océan. De Québec à Montréal, c'est un fleuve proprement dit, sauf que l'évasement du lac Saint-Pierre indique qu'il n'est pas sorti de la période de sa formation. Le savant géographe Elisée Reclus nous disait qu'il faudra des milliers et des milliers d'années pour voir disparaître les grands lacs et supprimer les chutes, les cascades, de façon à faire remonter le fleuve jusqu'à Duluth. Nous avons le temps de nous y préparer.

Avant donc que les rivages des lacs canadiens empiètent aussi copieusement sur les eaux qui les baignent, nous aurons le loisir de les peupler, tels qu'ils sont, et d'y créer des républiques, des royaumes, des empires, à côté desquels les pays d'Europe ne sont que de simples duchés. Il n'y a pas un continent qui puisse nous montrer cette merveille d'une navigation océanique pénétrant en plein dans son centre, et le moment n'est pas éloigné où les canaux supprimeront tous les obstacles qui s'opposent au passage des plus grands navires de Chicago et Duluth jusqu'à l'Atlantique.

Le bassin des grands lacs n'est autre chose que le Saint-Laurent, ligne de division entre les Etats-Unis et le Canada. La sortie, le canal d'écoulement qui va à la mer, est à la fois une chaîne de lacs, de cascades, un bout de fleuve et un estuaire, celui-ci décoré du nom de golfe. L'affluent que l'on considère comme la source du système, parce qu'il se trouve dans l'axe géographique du bassin, c'est la rivière Saint-Louis, qui coule dans le Minnesota. Une partie des rivages du lac Supérieur et son île principale, sont territoires minnesotien. Tout le lac Michigan et le double versant des terres qui l'encerclent appartiennent aux Etats-Unis. La moitié des lacs Huron, Sainte-Claire, Érié, Ontario, sont également propriété des Etats-Unis. La ligne de partage politique se continue en descendant le cours des eaux jusqu'à Saint-Régis où les deux côtés du Saint-Laurent sont attribués au Canada; cependant un tributaire considérable, la rivière Richelieu, vient du lac Champlain, en territoire new-yorkais. Le bassin du Saint-Laurent étant de près de 400,000 lieues carrées, le Canada en possède un peu moins que la moitié et cela dans la portion d'aval principalement, tandis que les Etats-Unis ont leur plus grande étendue dans la partie d'amont.

Le projet de canaliser l'Ottawa est aussi ancien que la découverte du pays, seulement, il fallait attendre que la colonisation eût marché. Nous pouvons même aller en arrière bien plus loin que tout cela, puisque autrefois, le lac Huron se déchargeait moitié par l'Ottawa, moitié par le Détroit comme aujourd'hui. Le mot "autrefois" signifie à peu près trente mille ans. La région du Nipissing ayant subi un jour la secousse du feu central, les terres se sont un peu soulevées, de sorte que

l'ancien niveau a été changé au détriment de l'Ottawa qui n'a plus charrié les eaux du lac Huron.

En attendant que nous allions de nouveau dérober à "la mer douce des Hurons" un volume d'eau suffisant pour faire flotter des transatlantiques sous les murs de la capitale du Canada, il ne serait pas hors de propos de consulter notre histoire et de remettre au jour ce qu'elle nous enseigne sur les premiers temps de l'apparition des Français dans le Haut-Canada.

Dès l'époque de Champlain, 1615-1630, "les pays d'en haut" formaient une colonie distincte pour les fins des missions; c'était la base d'opération des découvertes lointaines; on espérait que l'humble cultivateur civilisé s'en emparerait bientôt et que le commerce de Centre-Amérique s'y concentrerait. Un rêve en ce temps-là; deux siècles se sont écoulés avant sa réalisation.

De 1630 à 1830, les Européens ont formé des groupes sur le Saint-Laurent et dans l'est des Etats-Unis. Durant les soixante-quinze années qui viennent de s'écouler, nous avons entrepris d'envelopper les grands lacs de nos établissements tant du côté du Canada que du côté des Etats-Unis.

Un jour prochain, l'Amérique du nord tournera autour de ces océans d'eau douce.

* * *

L'automne de 1603, après le retour de Champlain en France, un poète, qui signe "LaFranchise", et qui pouvait bien être Lescarbot lui-même, composa les huit vers suivants:

Muses, si vous chantez, vraiment je vous conseille
Que vous loueiez Champlain pour être courageux.
Sans crainte des hasards, il a vu tant de lieux
Que ses relations nous contentent l'oreille.

Il a vu le Pérou, Mexique, et la merveille
Du vulcain infernal qui vomit tant de feux;
Et les sauts Mocosans qui offensent les yeux
De ceux qui osent voir leur chute nonpareille.

Champlain n'a pas vu le Pérou, mais il a visité le Mexique et a pu contempler le Popocatepelt, volcan qui s'élève à près de dix-sept mille pieds. Si les "sauts Mocosans" sont là pour signifier Niagara, il faut dire encore que Champlain ne les a pas vus. Néanmoins, La Franchise fait comprendre ici que son héros les avait au moins approchés.

"Mocasa" est l'ancien nom de la Virginie; le Niagara se trouve un peu moins proche de la Virginie que de l'île de Montréal où Champlain s'était arrêté. Lescarbot a écrit, en 1610, une pièce de vers dans

laquelle il parle des grands sauts que les sauvages disent rencontrer en remontant le Saint-Laurent, au-dessus de Montréal “ jusqu’au voisinage de la Virginie.” Ce dernier nom se donnait communément à toute la côte qui va de New-York à la Floride. Une rivière de la vraie Virginie passait alors pour avoir sa source près du Japon, parce que les Sauvages mentionnaient les immenses nappes d’eau que renferme l’intérieur du pays et que l’on pensait être des bras de mer ou des baies profondes appartenant au système du Pacifique. On crut, ensuite, que l’Ohio et le Mississipi conduisaient à la mer de l’Ouest, la mer Vermeille, l’océan Pacifique enfin. Nous pensons que les “ Sauts Mocasans ” signifient le Niagara.

Champlain a indiqué le premier cette chute dans la carte de 1612 et l’appelle simplement *Sault d’Eau*. Il trace avec assez d’exactitude la rivière du Niagara (sans lui donner de nom) avec ses îles, mais il place la cataracte à l’entrée du lac Ontario. Le Père Jérôme Lalemant dit, en 1640, “ Du premier bourg de la nation Neutre (le plus rapproché des Hurons) que l’on rencontre y arrivant d’ici (chez les Hurons) continuant de cheminer au midi ou sud-est, il y a environ quatre journées de chemin jusqu’à l’embouchure de la rivière si célèbre de cette nation, dans l’Ontario ou lac Saint-Louis. Au delà de cette rivière, et non au delà comme le marque quelque carte, sont la plupart des bourgs de la nation Neutre. Il y en a trois ou quatre au delà, rangés d’orient à l’occident, vers la nation du Chat ou Eriehronons. Cette rivière ou fleuve est celui par lequel se décharge notre grand lac des Hurons ou Mer-Douce, qui se rend premièrement dans le lac d’Érié ou de la nation du Chat, et jusque-là elle entre dans les terres de la nation Neutre et prend le nom d’Onguiaahra jusqu’à ce qu’elle se soit déchargée dans l’Ontario ou lac Saint-Louis.... Les Sonontsehronons sont une nation d’Iroquois la plus redoutée et la plus voisine de nos Hurons, comme n’étant éloignés que d’une journée du dernier bourg de la nation Neutre, nommé Onguiaahra, du même nom que la rivière”. Il s’en suit que les Neutres avaient trente-six villages en territoire canadien, comme nous le savons d’autres sources et trois ou quatre du côté des Etats-Unis à présent. La rivière, du lac Érié au lac Ontario, se nommait Onguiara et le village neutre le plus voisin, à l’est, portait aussi ce nom. Après avoir dépassé les villages neutres on rencontrait, à Lockport, le premier bourg sonontouan.

M. l’abbé Jean-André Cuoq, du séminaire de Saint-Sulpice, dit dans son *Lexique de la langue iroquoise*, p. 7: “ *Iorakahre* — retentir, résonner, se faire entendre, faire du bruit, être sonore”. La racine du mot est mohawk, (agnier). M. l’abbé J. Guillaume L. Forbes, curé de Sainte-Anne de Bellevue, familier avec la langue iroquoise, pense que

Niagara est une corruption de *Onguirra* ou *Onguirha* qui provient de la même source que *Iorakhare*, mais plus particulièrement usité par les Goyogouins et les Tsonnoutouans, tribus voisines de la cataracte.

Le Père Jérôme Lalemant revient sur le sujet en 1648: "Le lac Erié va se précipiter par une chute d'eau d'une effroyable hauteur dans le lac Ontario"; il ne donne pas de nom à la chute.

La carte dressée à Paris, en 1656, par Nicolas Sanson donne à la chute sa véritable position et met "*Ongiara*" tout auprès mais ce terme s'applique au village qui est indiqué à l'est de la rivière, puisque le dessinateur écrit "*Sault*" pour désigner la chute. Le nom de "*Niagara*" ne se trouve pas dans les anciens auteurs. On le voit apparaître dans la carte du Père Hennepin de 1682 et se rapportant à la chute seulement. Ce doit être une corruption d'*Onguira* faite par les Français. (*Relations*, 1641, pp. 71, 75; 1648, p. 46; le Père Martin: *Bressani*, 63, 324; *Brébeuf*, 203; Harris: *Early Missions*, 20, 120, 126).

L'aspect de cette chute célèbre, ce tonnerre inouï, cette colonne d'eau du déluge, comme le dit Châteaubriand, n'impressionne pas toujours les visiteurs au premier coup d'œil. Les proportions nous échappent devant une telle masse liquide en mouvement, de même que l'aspect de la basilique de Saint-Pierre de Rome ou des Pyramides désappointe celui qui les regarde tout d'abord sans prendre un terme de comparaison, ou sans faire aucun calcul.

Les Français qui, de 1625 à 1647, se sont trouvés en présence du phénomène n'ont pas daigné en faire mention dans leurs écrits. Il est vrai que, de leur temps, peu d'hommes s'avisèrent de penser aux beautés des forêts, à la majesté des montagnes et au charme des fleuves, pas plus que l'on ne se préoccupait des oiseaux, des fleurs ou des papillons, et l'on eut pris pour de l'extravagance un propos roulant sur la lune, les étoiles ou les aurores boréales. La littérature du XVII^e siècle est singulièrement dépourvue des ressources que nous offrent les attraits de la végétation et de la vie animale, de même que le spectacle du firmament.

Les poètes parlaient des fleurs et des oiseaux, mais les prosateurs s'en gardaient bien!

Corneille a mis toutes ses études de la nature dans "Cette obscure clarté qui tombe des étoiles". Racine risque "l'horreur d'une profonde nuit". Un prédicateur parlant de l'apôtre saint Pierre s'arrête court sur le chant du coq, n'osant pas prononcer le nom de ce réveil-matin banal. La splendeur des eaux, les grâces et les attraits de certaines bêtes, l'admirable variété des plantes, ces chefs-d'œuvre du Créateur, n'ont pas été remarquées durant six mille ans. La Fontaine en parle, mais pour imiter Esope qui leur assignait des rôles dans son théâtre de fabuliste. Les fleurs et les oiseaux ont été découverts par

Jean-Jacques Rousseau, en France, par Bernardin de Saint-Pierre, à l'île Maurice, par Châteaubriand, en Amérique, il y a un peu plus de cent ans. Vers 1800 on commençait à peine à soupçonner le pittoresque des montagnes, des cascades et des plateaux de la Suisse. C'est l'infortuné duc d'Enghien qui paraît avoir attiré l'attention de ses amis sur ces beautés naturelles.

Cartier n'a pas observé les colorations des forêts canadiennes en automne, bien qu'il les ait vues au moins durant deux saisons. Champlain parlera du saut de la Chaudière parce qu'elle interrompt la navigation et aussi à cause de la cérémonie pratiquée en cet endroit par les Sauvages pour s'attirer les faveurs du manitou de l'abîme, mais il ne célébrera ni le grandiose ni le pittoresque de ces flots tourmentés. En présence des douze chutes des Chats, il n'a rien à dire. Depuis la découverte du lac Ontario, jusque vers 1800, les Mille-Iles ont été traversées par nombre d'hommes instruits mais indifférents au spectacle enchanteur qu'elles présentent de toutes parts. Cavelier de la Salle, qui connaissait la localité depuis 1669, écrivait dix ans plus tard, en y repassant, que l'eau du Niagara tombe de plus de cent vingt toises, par conséquent, plus de sept cents pieds. Le Père Louis Hennepin, récollet, fait exception aux coutumes de son temps (1678) et se pâme d'admiration devant cette prodigieuse descente d'une grande rivière qui perd pied. Comme le brave Père est plein d'enthousiasme, il fait parler sa plume avec l'abondance de notre école descriptive actuelle. Il est verbeux, exubérant, il s'exprime par images, fait des comparaisons qui grandissent, enflent, étirent le sujet outre mesure, et finit par affirmer que la hauteur du précipice est de six cents pieds.

La Hontan (1687) parle du couloir situé entre le rocher et la masse d'eau qui tombe. Il donne à "cette effroyable cataracte" une demie-lieue de largeur et sept ou huit cents pieds de hauteur.

La chute à cent soixante et sept pieds de haut du côté des Etats-Unis et cent cinquante-huit vers le Canada. D'une rive à l'autre, elle a quatre mille et soixante-dix pieds, parce que elle forme, du côté du Canada, une courbe très forte appelée le Fer-à-Cheval. Son débit est de quinze millions de pieds cubes par minute. Le fond de la rivière venant du lac Erié, en arrivant à l'endroit du saut, est beaucoup plus creux du côté canadien, aussi les neuf-dixièmes des courants se portent-ils vers le Fer-à-Cheval. M. Peter A. Porter, dont la famille a longtemps possédé les terrains de la chute, nous dit que, le 29 mars 1848, l'eau cessa de couler à peu près entièrement à la suite d'un vent qui avait soufflé avec persistance en refoulant les glaces dans le lac Erié, si bien qu'il s'établit une sorte de mascaret et qu'il ne restait plus qu'une mince couche d'eau dans l'espace des douze ou treize milles situés im-

médiatement en amont de la chute. Le niveau avait aussi beaucoup baissé dans les dix autres milles qui s'étendent jusqu'au lac Erié. De ce lac à la chute, il y a vingt-deux milles. Lorsque le vent tomba, le flot revint avec une allure effrayante, à la façon de la Mer Rouge engloutissant l'armée de Pharaon.

* * *

Parlant de ce qui se passait en 1607 au sujet des découvertes, Champlain dit qu'il fit rapport à Henri IV "du moyen de trouver le passage de la Chine sans les incommodités des glaces du nord ni les ardeurs de la zone torride", ce qui veut dire à travers le Canada. L'année suivante (3 juillet) il fondait un modeste poste de traite à Québec, sous la protection de Pierre Dugas dit le sieur de Monts. Jamestown, en Virginie, avait été commencé quatorze mois auparavant par le capitaine John Smith.

Dans l'état d'instabilité des affaires de France, la découverte de Cartier n'avait pu porter fruits, mais sous Henri IV il devenait possible d'entreprendre un établissement quelconque sur les bords du grand fleuve, et c'est pourquoi, en 1608, Champlain fut chargé de commencer un poste à Québec. Il y construisit une habitation où il passa l'hiver de 1608-1609, avec vingt-sept hommes, sur lesquels vingt moururent.¹ du scorbut, entre les mois de novembre-mai, de sorte qu'il ne resta que Champlain, le pilote Laroute, Nicolas Marsolet, Etienne Brulé et quatre autres dont les noms nous sont inconnus. Laroute ne se retrouve pas après 1610; Marsolet, natif de Rouen, vécut soixante-et-neuf ans à Québec et vit grandir la colonie; Brulé² devint interprète des Hurons et, à ce titre nous le rencontrerons plus tard. Ce dernier était originaire de Champigny, village situé au sud-est de Paris et paraît avoir été âgé de quinze ans en 1608.

Pontgravé étant arrivé de France au mois de juin 1609, Champlain alla rencontrer les Sauvages de l'Ottawa qui avaient promis de lui apporter des pelleteries au lac Saint-Pierre et qui finirent par l'engager à se rendre avec eux en haut de la rivière des Iroquois (la rivière Richelieu) pour semer la terreur chez leurs ennemis. Le résultat de ce voyage fut la découverte du lac Champlain et un combat qui, tout en effrayant

¹ L'hiver de 1620-21, à Plymouth, à quatorze lieues de Boston, sur cent hommes il n'en restait que quarante-six au printemps.

² Récemment, deux ou trois écrivains se sont demandés si le nom de Brulé ne provenait pas de ce que cet homme avait été brûlé par les Sauvages. Nous répondons: 1. il n'est pas mort par le feu, 2. de 1609 à 1636 son nom est mentionné plus de cinquante fois dans les annales du temps, 3. c'est un nom commun en France, qui correspond à celui de Burns en Angleterre.

les Iroquois pour le moment, ne pouvait améliorer la situation des affaires.

Charlevoix (I. 186) prend ces Sauvages pour des Outaouas. Il dit qu'ils étaient "répandus en divers endroits de leur rivière dont ils se prétendaient si bien les maîtres absolus qu'ils avaient établi un droit de péage sur tous les canots qui la remontaient ou la descendaient". Partout il écrit "Outaouais", ce qui ne se rencontre nulle part dans les documents antérieurs à lui. Nous verrons plus loin que les Outaouas demeuraient dans le lac Huron; qu'ils ne descendirent à Montréal qu'en 1655; et pour ce qui est du péage, cela concerne les Nipissisiens, les Algonquins de l'île des Allumettes. La phrase de Charlevoix renferme trois erreurs: nom, localité, péage.

* * *

Les Algonquins de l'Ottawa et les Hurons du voisinage de la baie Georgienne s'étaient engagés, si Champlain les assistait contre leurs ennemis, à le guider dans la découverte du Haut-Canada et de lui faire voir le lac Huron, ainsi que les mines de cuivre dont ils lui avaient parlé dès 1603. Qui eut pu prévoir, en ce moment où les Iroquois étaient tombés dans l'insignifiance, le terrible réveil de cette nation, trente années plus tard? Le fait de chercher à les intimider ne semblait ni grave ni présomptueux de la part des Français. Après trois siècles révolus on se croit justifiable dans certains livres de blâmer les hommes qui ont participé à tels ou tels actes, mais on ne tient pas compte de la marche des choses, des circonstances du temps, ni des événements fortuits que l'esprit humain sera toujours incapable de prévoir.

Si le désir de cimenter son alliance avec les hordes qui le fréquentaient au nord du grand fleuve a pu induire le fondateur de Québec à vouloir leur donner la suprématie sur une nation éloignée (les Iroquois) qui maraudait et gênait les mouvements des Français et de leurs alliés, il n'en faut pas conclure qu'il agissait à la légère. Quel est celui qui, ayant à coloniser la partie inférieure d'un fleuve immense, ne tenterait pas, tout d'abord, de se faire des amis chez les peuplades les plus voisines de ses propres établissements?

Il s'agit ici de l'une des démarches les plus importantes de Champlain. Les historiens se sont demandé s'il était politique, c'est-à-dire adroit, de provoquer les tribus iroquoises, au risque d'attirer sur la colonie française les conséquences d'une lutte sans merci. Examinons les faits: Cartier avait trouvé à Québec (1535) de nombreuses familles algonquines; sans égard pour les instances qu'elles lui faisaient, il était allé jusqu'à Hochelaga, pays habité par leurs ennemis. Le résultat de

ce voyage avait été, de la part des Algonquins, une froideur dont les Français n'avaient eu que trop à se plaindre, si bien que les rapports étaient devenus entre eux presque hostiles. Alors, perdant sans doute tout espoir de se concilier les gens de Donnacona, Cartier partant pour la France, ne se fit pas scrupule d'en enlever plusieurs, y compris le chef, et l'on sait que, cinq ans plus tard, les Français ressentirent vivement, à leur retour, les effets de la mauvaise réputation qu'ils s'étaient acquise, ce qui contribua beaucoup à rendre leur séjour difficile, dans la situation déjà incommode où ils se trouvaient.

Champlain, instruit par l'exemple de son prédécesseur, eut la précaution, dès son premier voyage (1603) d'adopter la ligne de conduite à laquelle Pontgravé s'était soumis à l'égard des Sauvages : il fit alliance ouvertement avec les groupes qui le venaient voir. C'étaient relations de bon voisinage que ces actes. En 1609, les Algonquins demandaient avec instances que les hommes blancs allassent en guerre contre les Iroquois ; ils offraient de s'y rendre avec eux, afin de répandre une salutaire terreur parmi ces redoutables ennemis. Refuser leur prière eut été renoncer à la bonne entente avec des voisins immédiats, première condition de la sécurité de Québec. Il fallait donc céder, dans l'espoir que les Iroquois cesseraient leurs incursions sur le bas Saint-Laurent, et que la quiétude, renaissant de cette façon, les Sauvages des environs de Québec se fixeraient à demeure et pourraient être civilisés. Ce dernier point n'était qu'un rêve généreux, car on ne parvint jamais à rendre les Algonquins sédentaires, ou industriels en aucune manière.

Ceux-ci, d'ailleurs, pouvaient tout aussi bien devenir dangereux si l'on refusait d'épouser leur cause. Nous appelons la démarche de Champlain raison d'Etat—il avait autant de droit de s'en servir que n'importe quel souverain qui déclare la guerre sur des motifs souvent, hélas ! assez futiles. On n'a pas oublié, non plus, que la réussite de la traite des pelleteries s'imposait à Champlain, pour soutenir l'habitation de Québec, puisque les bailleurs de fonds de la compagnie n'entendaient pas badinage sur cet article. Or, les Iroquois empêchaient la traite en "coupant les rivières." Un remède héroïque devenait indispensable. C'était malheureux, mais qu'y faire ! Et puis, on comptait peut-être sur le secours de la France...

Quelques-uns ont dit : "Il y allait de mort d'hommes." Et les Algonquins, les Montagnais, les Hurons étaient-ils sur un lit de roses ? Depuis des années, les Iroquois se mettaient à l'affût dans les bois, au bord des rivières et les massacraient sans pitié. La situation était insoutenable. Pour vivre tranquille il fallait chasser ces pillards, ces vulgaires assassins.

Mais on répond que les Iroquois ne furent pas chassés par l'attaque de 1609. Cette observation vaut les autres, c'est-à-dire qu'elle procède d'une confusion de faits et de dates. Les quelques coups d'arquebuse tirés au lac Champlain produisirent l'effet désiré. Les maraudeurs s'abstinrent de reparaitre sur le Saint-Laurent durant nombre d'années. On en profita pour faire des découvertes et étendre le nom français à trois cent lieues de Québec. Néanmoins, trente ans après 1609, les Iroquois reprirent le dessus. Oui, mais à qui la faute? Aux Hollandais, qui leur fournirent des armes à feu; à la France qui laissa la colonie sans ressource. Il n'y a pas à s'apitoyer sur les Iroquois de 1609; on peut chanter leur vaillance et leur courage, voilà tout.

A défaut d'autre raisonnement, il en est un qui exonère Champlain: les canots de traite ne pouvaient se montrer sans péril sur le fleuve; si l'on n'eut pas frappé coup aussitôt après la fondation de Québec, la chose eût été à faire dès la prochaine rencontre, car le premier convoi attaqué eût été défendu par les balles des Français qui allaient au-devant de la traite jusqu'à Montréal—que ces Français fussent ou non sous les ordres de Champlain. Un conflit de cette nature était inévitable à courte échéance. Ne voulant pas voir l'ennemi à ses portes, le vigoureux chef français alla lui imposer sa volonté. Cet acte d'énergie et de défense personnelle est légitime. Nous en ferions autant au besoin.

L'expédition du lac Champlain ajoutait aux connaissances géographiques déjà acquises. Il est à remarquer que, le même été, un navigateur anglais, Henri Hudson, pour le moment au service de la Hollande, et qui cherchait comme Verrazano, la route des grandes Indes, ou même de la mer du nord, remonta la rivière Manhatte (aujourd'hui l'Hudson) jusqu'au dessus du lieu où se trouve Albany. En pénétrant un peu plus loin, chacun de son côté, Champlain et lui se seraient rencontrés. Hudson était loin de se douter que, près des sources du fleuve dont il relevait le cours, il y avait un Français qui savait mieux que personne comment était fait l'intérieur de l'Amérique. La découverte du lac Champlain eut pour résultat de faire comprendre qu'il existait dans les Adirondacs une hauteur de terres partageant les eaux d'un côté vers le Saint-Laurent par la rivière Richelieu, de l'autre à la mer par l'Hudson. Or, Champlain ne cherchait pas la route de l'Atlantique, c'est pourquoi il songea, bientôt après, à se frayer un passage vers l'ouest, en remontant la rivière Ottawa. Nous le verrons à l'œuvre, cet homme incomparable qui faisait toujours grand et qui sut tailler de la besogne pour dix générations, en élargissant la carte de l'Amérique depuis Gaspé jusqu'au centre du continent.

Pénétrons maintenant dans le Haut-Canada pour en connaître la forme géographique aussi bien que les nations qui l'habitaient. De là, plus tard, nous verrons les découvreurs rayonner à de grandes distances et se faire des amis de plusieurs tribus, ce qui facilita à leurs successeurs l'entrée de régions encore plus éloignées.

L'été de 1610, à la traite qui avait lieu au lac Saint-Pierre, un garçon qui désirait apprendre l'algonquin, reçut permission de Champlain d'accompagner le chef Iroquet dans son pays, pour le visiter, "voir le grand lac" et observer les mœurs des Sauvages. De son côté, Iroquet confia aux Français un jeune homme de race huronne que l'on nomme Savignon et que Champlain conduisit en France l'automne de cette année. (Champlain 368-70). Ils revinrent ensemble l'été de 1611 et rencontrèrent à Montréal les chefs Charioquois, Ochétéguin, Iroquet et Tregouariti, frère de Savignon. Ces deux derniers étaient de la tribu d'Ochétéguin. Ces Sauvages ramenaient le garçon français parti avec leurs gens l'année précédente. (Champlain 390, 393-8). A défaut de renseignement précis, nous ne saurions dire comment se nommait le jeune homme en question. On a suggéré le nom de l'interprète Thomas, mais celui-ci semble avoir été un homme fait, en 1613, lorsqu'il est mentionné pour la première fois. Nous devons plutôt choisir entre Nicolas Marsolet et Etienne Brulé, qui tous deux étaient arrivés de France en 1608 jeunes garçons. Champlain écrit en 1610 que celui qu'il envoyait avec Iroquet "avait déjà hiverné deux ans à Québec". Nous connaissons amplement la carrière de Marsolet: il fut toujours interprète des Montagnais de Tadoussac. Brulé, au contraire s'adonna à la langue huronne et vécut constamment dans le Haut-Canada, aussi je l'adopte comme étant le voyageur de 1610.

Savignon retournant en son pays, à cent cinquante lieues de Montréal (vers le lac Simcoe) amena un jeune Français, avec la permission de Champlain. On ne cite pas le nom. (Champlain, 404, 408.) Iroquet, partant à son tour pour se rendre chez lui, à quatre-vingts lieues de Montréal (vers Perth ou Smith's Falls?) reçut un garçon des mains du chirurgien Boyer ou Bouvier, de Rouen, qui en 1610 et 1611, commandait une chaloupe de traite, mais n'était pas de la compagnie de Champlain. C'est tout ce que nous savons de ces deux envoyés. (Champlain 365, 406-8.)

Après ces départs survinrent les Algonquins de l'Île des Allumettes, qui firent leur trafic et retournèrent avec Nicolas Du Vigneau, employé de Champlain. (Champlain 412, 440).

Acceptant Etienne Brulé comme le premier émissaire, celui de 1610, nous dirons qu'il a, avant aucun autre individu de race blanche, remonté l'Ottawa jusqu'au site de la capitale. Peut-être a-t-il été plus

loin sur la même rivière, mais il n'y a rien pour nous justifier de croire qu'il a passé par la Matawan et a parcouru le lac Nipissing pour se rendre à la baie Georgienne. La route la plus commode et la plus courte était celle de la rivière Rideau.

Avec l'aide de ses nouveaux amis de la forêt, Brulé fournit à Champlain de copieux renseignements sur le petit pays des Hurons et aussi sur les ramifications lointaines des branches de la grande famille algonquienne, plus répandue en réalité qu'on ne l'avait cru jusqu'à ce moment. Il expliqua la situation d'une partie du lac Huron relativement à l'ensemble de la géographie de ces vastes contrées. Quatre des Sauvages qui l'accompagnaient affirmèrent avoir vu un océan fort éloigné de chez eux — ce que nous prenons pour le lac Supérieur. Ils parlaient aussi des naturels de la Floride qui les avaient visités récemment. Ce fait n'était pas inusité. Les peuples des bords de l'Atlantique et ceux des grands lacs communiquaient presque tous les ans ensemble pour les fins du commerce, car ils trouvaient avantageux d'échanger les produits de leurs contrées respectives. Verrazano avait entendu parler à la côte de la Caroline de l'existence des grands lacs qu'il prit pour l'océan Pacifique ou quelque chose approchant.

Il y avait alors à Paris un comité dont le chef était le fameux président Pierre Jeannin, confident d'Henri IV, et qui s'occupait de pénétrer le mystère des grands lacs. Champlain figurait dans ce groupe à titre de principale source d'information. On voulait savoir quelle était l'étendue de l'Amérique, de l'Est à l'Ouest, et comment se partageaient les cours d'eau, ces chemins qui marchent, dans les contrées de l'ouest et du nord-ouest.

La carte de Champlain publiée en 1612, montre le lac Saint-Pierre, la rivière Richelieu, le lac Champlain, le fleuve Hudson (qu'il nomme Dugas, en l'honneur du sieur de Monts) la rivière Ottawa "contrée des Algonmequins", Montréal, les rapides de Lachine, le lac Saint-Louis, les Mille-Iles, un lac "contenant 25 journées de canots des Sauvages" — c'est l'Ontario, que nul Européen n'avait encore vu. Tout cela est correctement tracé, sauf la rivière Ottawa qui est beaucoup trop rapprochée du Saint-Laurent; elle a une branche (la Lièvre?) qui se détache et va très loin au nord. La "contrée des Yrocois" est parfaitement dessinée avec le lac Oneida au milieu. La rivière Niagara ne porte aucun nom, mais tout auprès il y a "Sault d'eau". Plus loin est le tracé du lac Érié s'étendant du nord au sud, au lieu de l'Est à l'ouest, et marqué: "300 lieues de long". Le Haut-Canada est vaguement indiqué, on voit que c'est la partie inconnue. Les Chariocay¹ ou Hurons paraissent

¹ Charloquay et Ochateguin du lac Simcoe étaient chefs de ceux que l'on appela d'abord les "bons Iroquois" vu qu'ils parlaient la langue iroquoise;

au nord de Toronto, et l'on sait que, en effet, ils demeuraient auprès du lac Simcoe. A l'endroit que nous appelons Toronto, on lit : "Hontague-nay" et, dans le voisinage : "Ganontha hongnon". Au nord de la rivière Niagara est écrit "contrée des Equichonnonton".

* * *

La première visite de Champlain sur l'Ottawa eut lieu au mois de juin 1613. Il se rendit à l'île des Allumettes et là, désappointé de ne pouvoir pénétrer plus loin, il se contenta de recueillir des notions sur les peuples et les territoires environnant le lieu où il se trouvait. Nicolas du Vignau lui avait dit être allé, l'hiver de 1611-1612, à la baie d'Hudson, mais il n'avait pas même quitté l'île de tout l'hiver, ce qui n'empêche pas que, rendu en France (1612) il avait raconté une foule de choses qui ont été reconnues véritables par la suite. Champlain le qualifie de menteur, cependant il déclare que ce singulier fourbe lui disait la vérité—sauf en ce qui concerne un prétendu voyage à la baie d'Hudson, et encore, le récit de cette exploration apocryphe renfermait de bons renseignements.

Les Sauvages de l'Île, comme on les appelait, donnèrent des connaissances sur le lac Nipissing et les nations qui y demeuraient, tout en refusant d'y conduire les Français. A la manière dont Champlain s'exprime, il est visible que Brulé n'avait pas passé par là.

Le peuple de l'Île, ou des Allumettes, était commerçant. Depuis l'apparition des Français, il les recherchait jusqu'aux Trois-Rivières, à Québec, même à Tadoussac. Son espoir était de faire de l'Île un grand entrepôt au moyen duquel on trafiquerait chez les nations du Nipissing et vingt autres situées à l'ouest, au nord, partout.

Le chef Tessouat, surnommé le Borgne, de l'île des Allumettes, s'était rendu jusqu'à Tadoussac en 1603 et c'est là que Champlain avait fait sa connaissance. Les Français commerçaient alors depuis cinq ou six années dans le bas Saint-Laurent, ce qui explique la présence en ces lieux des Algonquins du haut de l'Ottawa. Champlain voyait dans tout cela la perspective d'un grand avenir.

Il croyait peut-être que la France allait se précipiter sur ses traces, prendre une possession effective des terres nouvelles, assurer à son drapeau plusieurs royaumes en Amérique—hélas ! trop de petites choses l'occupaient en Europe pour lui permettre de prêter son attention aux affaires du Nouveau-Monde. Il n'y avait pas encore un seul ménage à

ensuite les Français les nommèrent Hurons à cause de la forme de leur chevelure. Les Nipissiniens les désignaient par leur vrai nom : Houandate, dont on a fait Yendats, Wyandot, Ouendate.

Québec, Henri IV, assassiné en 1610, laissait un enfant pour roi de France; le parti italien de la mère de ce jeune prince était en guerre ouverte contre le parti des seigneurs français. La situation déplorable des affaires ne permettait ni à Champlain ni à personne d'invoquer la cause du Canada. Le pauvre grand homme ne perdit pas courage, cependant.

Rentré en France, l'année 1614, Champlain travailla, avec l'aide du prince de Condé, à la formation d'une compagnie commerciale composée des marchands de Saint-Malo et de Rouen; il y réussit. Le Canada pouvait donc enfin compter sur des gens sérieux et en espérer un grand développement, du moins on le croyait. Champlain demanda et obtint quatre missionnaires récollets, les Pères Denis Jamay, Jean Dolbeau, Joseph LeCaron et le Frère Pacifique Duplessis, avec lesquels il prit la mer à Honfleur, le 24 avril 1615 et arriva à Tadoussac, le 25 mai.

Le 24 juin, à l'embouchure de la rivière des Prairies, le Père Jamay, assisté du Père LeCaron, célébrait la première messe, en présence des Français qui faisaient la traite. Champlain était en ce moment sur la route de Montréal à Québec, où il arriva le 26; il en repartit le 4 juillet dans le dessein de se rendre chez les Hurons; le 8 il rencontra des gens qui lui dirent que le Père LeCaron s'était embarqué,¹ le premier juillet, avec douze Français et des Sauvages, à la rivière des Prairies, pour le pays des Hurons. Champlain partit à son tour² le neuf, avec Etienne Brulé, un domestique et dix Sauvages dans deux canots. Son devancier devait être alors tout prêt du lac Nipissing et, bientôt après, il arrivait chez les Hurons.

Champlain débarqua dans les mêmes lieux le 1er août. Déjà il savait que le pays des grands lacs ne lui diraient rien du voisinage de l'Océan Pacifique, néanmoins, sa soif de connaître ce continent mystérieux le poussait à explorer de plus en plus. Il se rendit compte, en peu de temps, de la géographie de presque tout le Haut-Canada.

Restait à expliquer l'ouest et le nord-ouest—ce qu'il ne put faire durant les vingt autres années qu'il vécut sur le Saint-Laurent, mais il a assez bien compris le côté nord des grands lacs.

* * *

Entrant dans le lac Huron, Champlain dit : « Nous fîmes rencontre de trois cents hommes d'une nation que nous avons nommés les Cheveux-Relevés, pour les avoir fort relevés et agencés, et mieux peignés que nos courtisans; ils me firent entendre qu'ils étaient venus en ce lieu

¹ Sans plus tenir compte de Champlain que si ce dernier n'existait pas.

² Les neuf Français que nous verrons avec Champlain, quelques semaines plus tard, devaient être les hommes du Père Le Caron.

pour faire sêcherie de ce fruit appelé blués (bluets) pour leur servir de manne en hiver.” Dans la gravure où il nous montre les guerriers de cette nation, on voit que ceux-ci sont munis de grands boucliers comme armes défensives. Champlain ajoute: “Ils portent ordinairement une rondache de cuir bouilli qui est d’un animal comme le buffle.” C’est la plus ancienne mention connue du bœuf illinois, ou buffalo aujourd’hui.

Comme ce peuple occupe beaucoup les historiens, citons une note de feu M. l’abbé Laverdière à leur sujet: “Le nom huron des Cheveux-Relevés était Ondatahouat (Sagard: *Histoire du Canada*, p. 199) ou Ondatakouat (*Relations des Jésuites*, 1654, p. 9). Sagard, dans son dictionnaire de la langue huronne, nous donne de plus le nom des trois nations qui en dépendaient: les Chiserhonon, les Squierhonon et les Hoinderhonon; c’étaient probablement autant de tribus d’une même nation”.

Sagard nomme ces tribus dans la langue des Hurons, tandis que les Cheveux-Relevés parlaient l’algonquin.

Il est à remarquer que le nom de “Cheveux-Relevés” n’est point la traduction du mot “ondatahouat”. Ondata ou Onnhata, en huron signifie bois; il est tout à fait probable que la nation de Bois, ou les gens de Bois, dont parle Sagard (*Histoire du Canada*, p. 197) sont les Ondatahouat mêmes. “Ils sont dit-il, en parlant de ces gens de Bois, dépendant des Cheveux-Relevés et comme une même nation.” Du mot ondatahouat s’est formé outaouat, outaoua, nom sous lequel on a désigné plus tard tous les Algonquins Supérieurs, c’est-à-dire ceux à l’ouest de l’Ottawa.

Les écrits du temps portent: un Outaoua, les Outaouas, ou les Outaouak, parce que, dans la langue de cette nation, la lettre k forme le pluriel. L’orthographe: *Outaouais* n’est fondée sur rien. Elle a été inventée par Charlevoix. Les Anglais en ont fait *Ottawa*.

Ces Cheveux-Relevés ne demeuraient point à l’embouchure de la rivière des Français où Champlain les rencontra en 1615, puisqu’il dit qu’ils y étaient venus pour faire sêcherie de bluets. Quelques années plus tard, lorsque Sagard suit la même route, il trouve au même endroit ces Cheveux-Relevés “qui étaient venus camper proche la mer Douce à dessein de traiter avec les Hurons et autres qui retournaient de la traite de Québec.” Où était donc la demeure de ces peuples? Champlain, dans sa grande carte de 1632, les place à l’ouest de la nation du Petun, ce qui porterait à croire qu’ils occupaient cette longue pointe, le comté de Bruce, qui s’avance dans le lac Huron, vers les îles de Manitoulin, mais il est certain que les Petuneux occupaient tout le comté de Bruce. D’un autre côté, la *Relation* de 1640, p. 34 place dans ces îles mêmes les “Outaouan peuple venu de la nation des Cheveux-Relevés,” ce qui est

d'accord avec la *Relation* de 1671, p. 31, où il est dit que l'île Ekaentouton (Manitoulin) était l'ancien pays des Outaouas; et avec Nicolas Perrot qui appelle cette île "l'île des Outaouaks." Il est certain qu'ils demeuraient à la grande île Manitoulin. La Hontan (lettre XV.) dit que les "Outaouas du Talon, appelés Otontagans, habitaient dans l'île Manitoulin." Si l'on fait attention que cette île n'est pas figurée sur la carte de Champlain, et que la Mer Douce y est posée en longueur, de l'est à l'ouest, tandis qu'elle est nord-ouest, sud-est, on trouvera que l'endroit assigné dans cette carte, aux Cheveux-Relevés, n'est pas en contradiction avec les textes que nous avons rapportés, ou du moins ne prouve pas que les Outaouas n'aient point habité cette île, même à cette époque. Ailleurs, il dit que les Cheveux-Relevés demeuraient au sud ou au sud-ouest du fond de la baie Georgienne.

Charlevoix à le premier commis l'erreur de localiser les Outaouas sur la rivière qui porte leur nom; c'est parce que, de son temps, ces Sauvages la descendaient pour aller faire la traite à Montréal, et déjà, dans le langage courant, on ne disait plus "la rivière des Algonquins, la rivière des Prairies" mais "la route ou chemin des Outaouas, et la Grande Rivière". Il existe un cas semblable au sujet des Sokokis, qui résidaient au sud-ouest de la rivière Kénébec et s'étendaient dans le New-Hampshire jusqu'à la rivière Connecticut par laquelle ils descendaient à la mer, aussi appelait-on ce cours d'eau la rivière des Sokokis, et tout le monde croit que cette peuplade en habitait les bords.

Reprenons le récit de Champlain: "Les Ondatahouats ou Cheveux-Relevés sont grands chasseurs, pêcheurs et voyageurs, cultivent la terre et sèment du blé d'inde, font sêcherie de bluets et framboises, de quoi ils font un grand trafic avec les autres peuples, desquels ils prennent en échange des pelleteries, porcelaines, filets et autres commodités. Quelques-uns de ces peuples se percent les naseaux où ils attachent des paterôtes; se découpent le corps par raie où ils appliquent du charbon et autres couleurs; ont les cheveux forts droits, lesquels ils se graissent et peignent de rouge, et leur visage aussi."

Au mois de janvier 1616, Champlain visita chez eux les Cheveux-Relevés, qui le reçurent avec des marques d'amitiés. "Ils font la guerre, dit-il, à une autre nation qui s'appelle Assistagueronon,¹ qui veut dire des Gens de Feu, éloignés d'eux de dix journées...." Cette nation du Feu se nommait aussi Mascoutins en langue algonquine. Elle habitait entre la baie de Saginaw et le Détroit. Champlain continue: "Les Cheveux-Relevés sont en grand nombre et la plupart grands guerriers, chasseurs et pêcheurs.... La plus grande part cultivent des blés d'Inde et

¹ En langue huronne-iroquoise.

ai tres. Ce sont chasseurs qui vont par troupes en plusieurs régions et contrées, où ils trafiquent avec d'autres nations éloignées de plus de quatre à cinq cents lieues. Ce sont les plus propres Sauvages que j'aie vu en leurs ménages et qui travaillent le plus industrieusement aux façons des nattes, qui sont leurs tapis de Turquie... Ils me prièrent fort de les assister contre leurs ennemis, qui sont sur le bord de la Mer Douce, éloignée de deux cents lieues."

En 1624, Sagard dit que les bandes des Cheveux-Relevés "font la guerre à une autre nation nommée Assistagueronon, qui veut dire Gens de Feu, car en langue huronne "assista" signifie du feu, et "eronon" signifie nation. Ils sont éloignés d'eux, à ce qu'on tient, de neuf à dix journées de canots, qui sont environ deux cents lieues et plus de chemin." Le Père LeJeune disait, en 1640: "Au sud de la nation du Castor (côte d'Algoma), il y a une île, dans la mer Douce, longue d'environ trente lieues, habitée des Outaouans, ce sont peuples venus de la nation des Cheveux-Relevés". La carte du Père Ducreux (1660) indique une grande île dans la situation de Manitoualin, avec la marque: *Natio sur-rectorum capillorum*.

Sagard arrivant par l'Ottawa et le lac Nipissing, en 1623, rencontra "deux canots de Sauvages de la nation du Bois, qui est fort éloignée et dépendante des Cheveux-Relevés". Rendu à la baie Georgienne, côte sud-est, il dit: "Nous allâmes cabaner en un village d'Ondatahouats que nous disons Cheveux ou Poil levé, qui s'étaient venus poser proche la mer Douce à dessein de traiter avec les Hurons et autres qui retournaient de la traite de Kébec... Ces Sauvages portent leurs cheveux relevés sur le front, plus droits que les perruques des dames, et les font tenir ainsi par le moyen d'un fer ou d'une hache chaude, ce qui n'est point autrement de mauvaise grâce... Ils sont errants, sinon quelques-uns d'entre eux qui bâtissent des villages au milieu des bois, pour la commodité qu'ils trouvent d'y bâtir et les fortifier. Tous ensemble font la guerre à une autre nation nommée Assistagueronons... Ils se transportent jusqu'au delà de la nation des Puants où ils trafiquent leurs marchandises..."

Sagard ajoute: "La plupart des hommes parmi les Cheveux-Relevés sont grands guerriers, chasseurs et pêcheurs. Ils sont errants, sinon que quelques villages sèment des blés d'Inde. Ils vont par troupes en plusieurs régions éloignées de plus de quatre cents lieues, à ce qu'ils m'ont dit, où ils trafiquent de leurs marchandises et échangent pour des pelleteries, peintures, porcelaines et autres fatras. Ils entretiennent tous leurs cheveux sur le front fort droits et relevés, plus que n'étaient ceux que nos demoiselles portaient anciennement. Ils sont coupés de mesure,

allant toujours en diminuant et raccourcissant de dessus le front, jusqu'au derrière de la tête, mais la nudité entière de leurs corps m'était d'un grand déplaisir qui m'empêchait de les voir librement. J'ai vu là beaucoup de femmes et de filles qui faisaient des nattes de jones grandement bien tissées et embellies de diverses couleurs, qu'elles traitaient par après pour d'autres marchandises des Sauvages de diverses contrées qui abordaient en leur village."

Si, en 1624, les Outaouas achetaient des pelleteries des nations plus éloignées, c'est qu'ils les vendaient aux Français et ils témoignaient par là d'une disposition naturelle au commerce. Avant l'arrivée des blancs, ils ne songeaient pas à faire de telles entreprises. Ils furent d'habiles accapareurs, comme nous le verrons par la suite.

* * *

Champlain parle du lac Huron¹ qu'il appelle lac des Attigouautans d'après le nom d'une des plus considérables tribus huronnes, celle de l'Ours, la plus voisine de la baie Georgienne. Il donne au lac près de quatre cents lieues de longueur, de l'orient à l'occident, et il ajoute: "Pour la grande étendue d'icelui, je l'ai nommé la Mer Douce." On doit comprendre que de l'embouchure de la rivière des Français, il côtoya la rive est de la baie Georgienne, sans en voir davantage. Il donne au lac Huron une largeur de cinquante lieues. Sur sa carte de 1632, il réduit la longueur des deux tiers, et c'est encore double de la vraie mesure. M. l'abbé Charles-Honoré Laverdière observe que Champlain a pu apprécier la longueur du lac sur le nombre des journées de canots que comptaient les Sauvages depuis le pays des Hurons jusqu'au fond du lac Michigan, ou du lac Supérieur, ou même des deux réunis. En 1616, il dit que le lac "contient près de trente journées de canots," ce qui est assez d'accord avec la mesure du contour du lac.

Le pays des Hurons s'étendait de Collingwood au lac Simcoe et était borné par les rivières Severnes et Nottaouassaga. En 1615, Champlain s'exprime ainsi: "Il y a dix-huit villages... peuplés de deux mille² hommes de guerre, sans en comprendre le commun, qui peuvent faire un nombre de trente mille âmes³."

...En telles cabanes il y aura (jusqu'à) douze feux, qui font quatre ménages." Dans l'édition 1632, il met vingt mille âmes. Sagard dit que les Hurons avaient, en 1624, vingt ou vingt-cinq villages.

¹ Les Sauvages le nommaient Karegrondi (Martin: *Brébeuf*, 47).

² Cela suppose une population de dix mille âmes et non pas trente mille ni vingt mille. (J.-C. Taché: *Recensement* de 1870, IV. p. IV. LIV.

³ Peut-être que les Petuneux sont inclus dans ce dernier chiffre.

Le Père Le Jeune écrivait, de Québec, en 1634: "J'apprends qu'en vingt-cinq ou trente lieues de pays qu'occupent les Hurons—d'autres en mettent bien moins—il se trouve plus de trente mille âmes." (*Relation*,¹ 1634, p. 90.) "Nos Hurons sont en vingt villages environ trente mille âmes." (*Relation*, 1636, p. 138.) "Le pays des Hurons se doit entendre à proprement parler, d'une certaine petite portion de terre, qui, en longueur, d'orient en occident, n'a pas plus de vingt à vingt-cinq lieues, et en largeur n'est pas en plusieurs endroits considérable, et en pas un ne passe sept ou huit lieues.... Dans cette petite étendue de terre... se trouvent quatre nations. Le nom général est S Wendat." (*Relation*, 1639, p. 50) "Il se trouve dans les cinq missions du pays des Hurons, trente-deux tant bourgs que bourgades, qui comprennent en tout environ sept cents cabanes; de feux environ deux mille, et environ douze mille personnes." (*Relation*, 1640, p. 62) Ces douze mille n'embrassent pas les Petuneux. "Le pays des Hurons nourrissait trente-cinq mille âmes, dans l'étendue de dix-huit lieues seulement." (*Relations*, 1653, p. 30, 1656, p. 39; 1658, p. 22.) Pierre-Esprit Radisson, disait vers 1667: "Les Hurons, il y a vingt ans, à ce que plusieurs m'ont assuré, se chiffraient par vingt ou trente mille âmes."

Sagard nomme les Hurons *Houandates*, dont on a fait Owendat, Wyandot, Yandot. Voici les noms de leurs principales tribus: Antigouantans—l'Ours; Antigenenons—le Loup; Arendoronons—le Faucon; Tahontaenrat—le Héron.

Le Père de Brébeuf disait en 1635: "Les cabanes de ce pays ne sont ni des Louvres ni des palais, ni rien de semblable aux riches bâtiments de notre France, non plus mêmes aux plus petites chaumines; c'est néanmoins quelque chose de meilleur et de plus commode que les taudis des Montagnais. Je ne vous saurais mieux exprimer la façon des demeures huronnes que de les comparer à des berceaux ou tonnelles de jardin, dont au lieu de branches et de verdure, quelques-unes sont couvertes d'écorce de cèdre, quelques autres de grosses écorces de frêne, d'orme et de sapin, ou perusse; et quoique celles de cèdre soient les meilleures, suivant l'avis et l'usage le plus commun, il y a néanmoins cette incommodité qu'elles sont quasi aussi susceptibles du feu que des allumettes, d'où procède quantité d'embrasements des bourgades entières et, sans aller plus loin que cette année, nous en avons vu, en moins de dix jours, deux grandes entièrement consommées... Il y a de ces cabanes ou berceaux de diverses grandeurs, les unes de deux brasses en longueur, d'autres de dix, d'autres de vingt, de trente et de quarante. La largeur ordinaire est d'environ quatre brasses; la hauteur est presque pareille.

¹ Edition en trois volumes publiée à Québec, 1858.

Il n'y a point de divers étages ; il ne se voit ici ni cave, ni chambre, ni grenier. On n'y voit autre fenêtre ni cheminée, qu'un méchant trou au haut de la cabane qu'on y laisse à dessein pour chasser la fumée. C'est ainsi qu'on nous a bâti la nôtre."

Le village était entouré de pieux pour la défense, mais les enceintes des Iroquois étaient bien autrement formidables. Quant au mode d'existence il était basé sur la culture du blé d'Inde, des fèves, des citrouilles, du chanvre et du tabac. L'organisation sociale et politique consistait en l'autorité des chefs, choisis pour leurs mérites. Chaque canton ou clan avait une législature composée des chefs et des vieillards de marque ; à part cela, survenant une question importante, chaque village élisait des députés.

Cette espèce de civilisation les rendait de beaucoup supérieurs aux Algonquins, mais autant, à leur tour, ils étaient inférieurs aux Iroquois qui poussaient bien plus loin l'art de construire des demeures, d'ériger des fortifications, de cultiver la terre et de se gouverner. Les Hurons ne pouvaient concevoir un plan général de défense ni se former à la discipline, de sorte que, à la guerre, ils ne valaient pas plus que les Algonquins, ce qui les rendit incapables de résister aux attaques savamment calculées et toujours si bien conduites des Iroquois.

On en vit un exemple durant l'hiver de 1615-16 lorsque Champlain les accompagna dans une expédition avec une dizaine de Français. Ils partirent du lac Simcoe, suivirent les rivières et les lacs qui débouchent aux environs de Kingston, où Champlain vit l'Ontario pour la première et seule fois de sa vie, sauf au retour. Ayant traversé du côté des Iroquois, ils firent le siège d'un gros bourg, mais l'inconstance et la mobilité d'esprit des Hurons gâta tout ; il fallut abandonner la tâche, alors que cinq cents guerriers Andastes, avec Etienne Brulé à leur tête, étaient à la veille de paraître sur le théâtre des hostilités. Ne voulant pas dépasser les bornes de cette étude, nous dirons que Champlain quitta le Haut-Canada l'été de 1616 et n'y retourna jamais.





ROYAL SOCIETY OF CANADA

TRANSACTIONS

SECTION II.

ENGLISH HISTORY, LITERATURE, ARCHÆOLOGY, ETC.

PAPERS FOR 1904





I.—A *Monograph of the Origins of Settlements in the Province of New Brunswick.*

(Contributions to the History of New Brunswick, No. 6.)

By WILLIAM F. GANONG, M.A., PH.D.

The Settlements of the Province of New Brunswick exhibit a remarkable irregularity in their geographical distribution, and a surprising diversity in the original nationality of their inhabitants. The population has the compactness of a large city in one place, is of various degrees of density in others, while it is wholly wanting in some great areas; and settlements of Indian, Acadian French, New England, Loyalist English, Scotch, Irish, Danish and other national origins are intermingled in a seemingly lawless manner. Yet every settlement, great or small, has its position, size, and nationality determined by perfectly definite causes, in part historical, in part sociological, and in part environmental. It is the task of the present work to attempt to explain these causes, to disentangle their complex interactions, and to explain precisely why each settlement in New Brunswick is where it is, and what it is.

CONTENTS.

INTRODUCTION.

Part I. The Factors determining the Origin and Distribution of Settlements in New Brunswick.

- A. Historical Factors.
- B. Sociological Factors.
- C. Environmental Factors. a. Geographical Situation. b. Accessibility. c. Communication. d. Climate. e. Soils. f. Forests. g. Fisheries. h. Land Animals. i. Mineral Products. j. Water-powers, k. Tides. l. Natural Scenery.

Part. II. The Operation of the Factors in the production of New Brunswick Settlements

1. THE PRE-HISTORIC (INDIAN) PERIOD (to 1604).
 - A. Historical Factors. a. Aboriginal immigration. b. Relations with earlier and neighbouring races.
 - B. Sociological Factors. a. Government. b. Occupations. c. Racial character. d. Religion.
 - C. Environmental Factors. a. Game (hunting and fishing) grounds. b. Communication. c. Favourable camp grounds. d. Positions free from insect-pests. e. Situations of great natural charm. f. Tool-quarries.
 - D. Summary.
2. THE PERIOD OF DISCOVERY AND EXPLORATION (1492-1604).
 - A. Historical Factors. a. Voyages of Cabot, Verrazano and Cartier. b. Voyage of de Monts to Acadia.
3. THE ACADIAN PERIOD (1604-1760).
 - A. Historical Factors. a. Attempt to settle Acadia through trading companies. b. The foundation of Nova Scotia. c. Early attempts to Christianize the Indians. d. Attempt to settle Acadia on the seigniorial system. e. The introduction of the Acadian People. f. The divided allegiance of the Acadians. g. The Emigration of the Acadians. h. The Expulsion of the Acadians. i. The Outlawry of the Acadians. j. Relations with earlier and neighbouring races.
 - B. Sociological Factors. a. Government. b. Occupations. c. Racial Character. d. Religion.
 - C. Environmental Factors. a. Accessibility. b. Communication. c. Good lands. d. Trading centres. e. Fishing (and hunting) centres. f. Water powers. g. Mineral Resources. h. Positions of great natural charm.
 - D. Summary.
4. THE ENGLISH PERIOD (1760-1783).
 - A. Historical Factors. a. The New England Immigration. b. Immigration from Great Britain. c. Attempt to settle Nova Scotia on the tenant system. d. Repatriation of the Acadians. e. The Revolution and Privateering. f. Relations with preceding settlers.
 - B. Sociological Factors. a. Government. b. Occupations. c. Racial Character. d. Religion.
 - C. Environmental Factors. a. Accessibility. b. Communication. c. Good lands. d. Influence of earlier settlers. e. Fishing grounds. f. Trading centres. g. Lumber trade. h. Water-powers. i. Mineral resources. j. Positions of natural charm.
 - D. Summary.

5. THE LOYALIST AND NATIVE EXPANSION PERIOD (1783-1812).

- A. Historical Factors. a. Advent of the Loyalists. b. Foundation of the Province of New Brunswick. c. Loyalist readjustment. d. Resumption of European immigration. e. Expansion of the Loyalists. f. Expansion of the Settlements of the English period. g. Acadian readjustment. h. Acadian expansion and immigration. i. Location of the Indians on reserves. j. Relations with earlier and neighbouring peoples. k. Artificial improvements in communication.
- B. Sociological Factors. a. Government. b. Occupations. c. Racial character. d. Religion.
- C. Environmental Factors. a. Accessibility. b. Communication. c. Good lands. d. Trading centres. e. Lumber trade. f. Water-powers. g. Fishing centres. h. Mineral resources. i. Positions of natural charm.
- D. Summary.

6. THE PERIOD OF ACTIVE IMMIGRATION (1812-1850).

- A. Historical Factors. a. Promotion of Immigration by the New Brunswick and British Governments. b. Settlement of the Disbanded Regiments. c. Immigration from the United States. d. Native expansion. e. Relations with earlier and neighbouring peoples. f. Artificial improvements in communication.
- B. Sociological Factors.
- C. Environmental Factors.

7. THE MODERN PERIOD (1850-1904).

- A. Historical Factors. a. Check in New Brunswick's growth through extrinsic causes. b. Continued but lessening European immigration. c. Sporadic American immigration. d. Native expansion. e. Labour Act and Free Grants Settlements. f. The Building of Railways.
- B. Sociological Factors.
- C. Environmental Factors.
- D. Summary.

8. THE PROSPECTS FOR THE FUTURE.

Part III. A synopsis of the origins of the individual settlements of New Brunswick, alphabetically arranged, with references to the sources of their history.

APPENDIX. SOURCES OF INFORMATION: BIBLIOGRAPHY.

INTRODUCTION.

A first view of the present subject inevitably gives the impression that the factors determining the origin and distribution of settlements in New Brunswick are so numerous, so complex in their interaction, and often so subtle, as to be impossible of disentanglement and definition. The problem is, in its character, very like some of those which have to be faced in the study of various phases of organic nature, and, attacked by the same methods, it can gradually be solved. This method consists essentially in this,—the selection and determination of the leading factors, and their individual study, from which knowledge only is it possible to understand their combination and interaction. One deals with these factors as the student of optics deals with his pencils of rays; the leading or extreme ones being known, the lesser and intermediate fall, almost of themselves, into their proper places. Practically this throws the present work into three divisions:—first, a study of the individual factors involved in the determination of the origins of settlements in New Brunswick; second, a study of the interaction of the various factors to produce the settlements as we find them, a study best worked out upon a chronological outline; and third, a summary of the subject from the point of view of the individual settlements, which will be most convenient if arranged in the form of a dictionary. Such is the plan of the present work.

Like the earlier Monographs of this series, this work is preliminary in character. Having no predecessor in its special field it must needs break new ground for itself, and, with so vast and complicated a subject, neither completeness nor great accuracy can be expected at a single step. Nevertheless I hope that it, as well as the earlier members of the series, will provide both a broad and a firm foundation for the future more detailed study of its interesting and important subject. •

History may be approached from either one of two distinct points of view. First, it is primarily a narrative of interesting events telling men of what happened in the past of their race or the world, and its tendency is to make prominent those heroic or other stirring events which appeal to the healthy human imagination or which magnify the merits or glory of one's own people. This is the popular, and to most persons the only, phase of history,—the one they read with pleasure and recommend as conducive to patriotism and other desirable qualities. Second, history is primarily an explanation of the *raisons d'être* of present social and political conditions. This is intrinsically much its more important phase, but it is of little popular interest, partly because it is intellectually difficult, and partly because, so far

from magnifying the merits of a particular people, it tends to subordinate them to their proper place in the world of mankind. The ideal history would be that in which a firm skeleton of the latter is clothed with graceful draperies of the former, but the power thus to combine the two is so rare as to be nearly non-existent. In both of these phases of history the study of the influences of factors controlling the migrations and settlements of peoples are recognized as important, and from the earliest times both phases have taken account of them, but with this difference, that to the former they are only incidental, while to the latter they are of fundamental importance. At the present time the tendency is more and more towards a realization of the great importance of environmental influences in particular in determining not only the settlement, but also the various characteristics of a people, and most modern historical works give this subject much attention, while there is a large and increasing literature devoted especially to it.

In the arrangement of the settlements of any country, we can readily trace the influence of two great primary sets of determining factors. First, there are those connected with great historical events, whether of discovery, conquest or peaceful expansion, which have sent certain peoples into that country, and these we may call the *Historical Factors*. Second, we can trace the effects of the physical nature of the country itself, its accessibility from abroad, the presence and direction of natural lines of communication, the kinds and distribution of its natural wealth, whether in climate, rich lands, forests, minerals, fish, water-powers, or natural scenery, and these we may call the *Environmental Factors*. Further study, however, shows a third group of factors determining the exact way in which the given people adapt themselves to the particular environment; this depends upon racial peculiarities, especially the race character, whether this be vigorous, adventurous, progressive, honest, or the reverse, and also in lesser degree upon occupations, social customs, religions, and these we may call the *Sociological Factors*. The origin of settlement in a country is much like the movement of waves breaking on a shore, though unlike the waves it does not recede; the historical factors provide the waves of population great or small, the sociological factors determine their power and the details of form and height, while the environmental factors determine how they shall ultimately expend themselves, whether they shall spread abroad on a shelving beach, find themselves checked by a resistless cliff, or run along easy channels to spread in open basins beyond. If one is studying the history of a people in general these three sets of factors are not far from equal in importance, but from our present single point of view, simply the origins of settle-

ments, they are very unequal in importance. The environmental here come first, the historical second, and the sociological third. This is chiefly because in the formation of settlements the original historical factors cease to operate with the accomplishment of the migrations they cause, while the later historical factors, at least those connected with the progress of the country itself, being themselves very greatly influenced by environmental conditions, are hardly of distinct importance. The sociological factors also are in time modified greatly by environment, the only one which is strongly resistant to such modification being the racial character, though even this yields in the end. The environmental factors alone are incessant in their action, and, in a broad way, almost unvarying in their operation, though it is true they may to some extent be modified by man, and also they are of very different relative values in the different periods of a country's history. With mankind, as with other phases of nature, the environment can, with time enough, mould the organism to a form adaptive to it; and, moreover, it can bring very different original organisms (*viz.*, races) into very similar ultimate forms, though in both cases there are limits to the process.

It is of course true that these three sets of factors are not distinct from one another; on the contrary they both are closely interlocked, and also re-act upon one another. The most important case of this interaction is found in the modification of environment by the action of man, which modification is determined in part by historical reasons, but in larger part by sociological causes, especially by those arising from a bold, progressive, dominating, racial character. This modification of environment shows itself most conspicuously in the development of artificial lines of communication, both highway roads and railroads, which permit of extensive settlement in regions where, from purely natural conditions, it would be impracticable, and which tend also to attract settlements towards themselves, especially at their junctions, foci, and other natural stopping-places. Another important case, not so much of modification of environment as of alteration in its influences through purely sociological reasons, is found in the formation of large settlements in places where they would not be determined by environmental features alone. This is conspicuously the case with the capitals or other governing centres of countries, in which artificial governmental needs often determine a much greater population than environmental influences alone would induce, and something of the same sort determines summer and health resorts. A third and important method by which sociological conditions modify the effects of environment is found in a tendency to aggregation of population caused by the attrac-

tiveness of the social, intellectual, and business opportunities offered in the cities, opportunities which become progressively more attractive the larger the community, thus producing a steady movement cityward largely in opposition to the tendency imposed by environmental tendencies alone. Yet another important modification of environmental by historical and sociological factors lies in the establishment of artificial political boundary lines, with their usual accompaniments of hostile customs tariffs, which invariably restrict the natural flow of trade, and hence act to the detriment of peoples, and the restriction of their settlements.

PART I.—THE FACTORS DETERMINING THE ORIGIN AND DISTRIBUTION OF SETTLEMENTS IN NEW BRUNSWICK.

As above noted these fall into three classes, which we shall consider separately.

A. *Historical Factors.*

The history of the Province has been so varied that these factors are numerous, and, moreover, they vary greatly with the different periods of our history. Hence it is practically better to treat them in detail later under the special periods to which they belong, and we need here note only the periods themselves. These are from our present point of view as follows:—

1. Prior to the advent of Europeans the Province was occupied by Indian tribes,—*The Pre-historic or Indian period.*

2. Nearly a half century after the discovery of America the discovery and exploration of the Province began, and continued, though very slowly, down to the beginning of settlement in 1604,—*The Period of Discovery and Exploration.*

3. In 1604 the French began to settle the Province, as part of Acadia, and continued their efforts, though with indifferent success, until it was taken from them by the English about 1760,—*The Acadian Period.*

4. After 1760 the English began to settle the Province, bringing settlers from Great Britain, and especially from the colonies to the south, which they continued until the advent of the Loyalists in 1783,—*The English Period.*

5. In 1783, at the close of the Revolution, the Loyalists, forced to abandon their homes in the revolted colonies, came in large numbers to

the still loyal Province of Nova Scotia and founded the Province of New Brunswick. Here they prospered and increased, with some aid from immigration, down to the war of 1812, giving a period of Loyalist and other native growth and expansion,—*The Loyalist and Native Expansion Period.*

6. After the war of 1812 a very active immigration from Great Britain, and particularly from Ireland, began, and continued down to about 1850, adding greatly to the population and settlements of the Province,—*The Period of Active Immigration.*

7. About 1850 the stream of immigration began to diminish, and thenceforth rapidly lessened. Meanwhile an active emigration of native settlers from the Province to the United States and the West commenced, so that, despite many material advances, the population has grown but little and latterly not at all, thus greatly checking the formation of new settlements. This period extends down to the present day,—*The Modern Period.*

B. Sociological Factors.

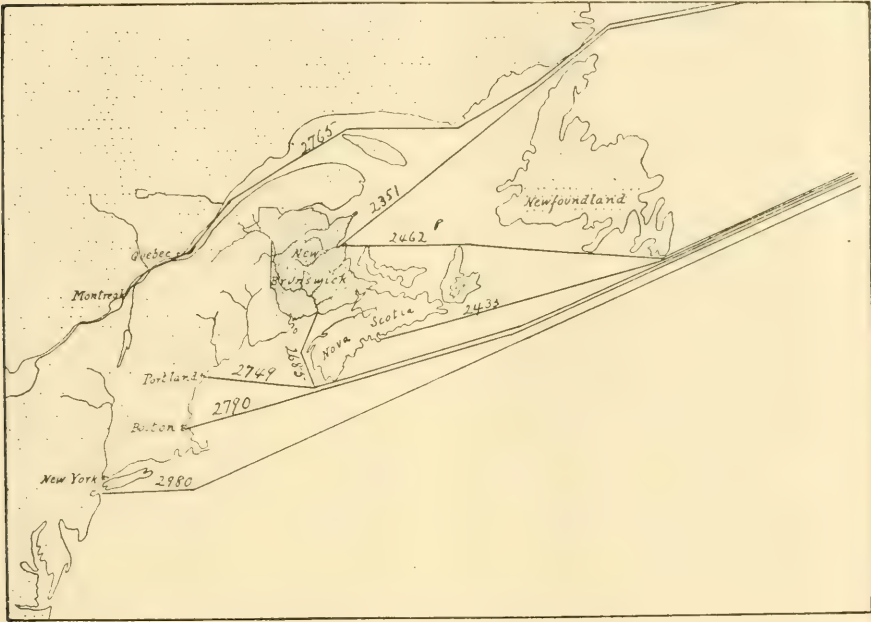
These, varying with the races sent into the Province by the Historical Factors, are likewise best treated under the special periods later in this paper, and they will be considered there.

C. Environmental Factors.

These remain constant throughout all of the periods of our history, though with varying potency in the different periods, and should, therefore, be treated here in outline. In details, however, they may best be considered in connection with the special periods. The general factors of most importance are the following:

a. Geographical Situation. New Brunswick lies in the northern hemisphere just north of half way from equator to pole (mostly between 45° and 48° N.), and in the western hemisphere, one-fifth of the circumference of the earth from western Europe (mostly between 64° and 68° W.). It lies towards the eastern and north-eastern part of the great continent of North America, but not in the natural line of sea travel from one continent to the other, although, owing to the existence of an artificial political boundary across the middle of the continent just south of it, it is on the line of travel for the northern half in winter when other avenues are closed by ice. Its somewhat irregular outline is reducible roughly to a quadrilateral, some 190 miles from north to south and 140 from east to west, equivalent to a square of about 165 miles on a side and containing somewhat more than 27,000 square miles.

b. Accessibility. Of the four sides of the Province, practically all of two and about a half of the third are bounded by the sea and freely open to access by sea-going vessels (Map No. 2). There is, however,



MAP No. 2. To illustrate the position of New Brunswick in relation to America and Europe. The figures show the distances in miles by the respective lines to Liverpool. On Mercator's projection.

one striking peculiarity about these coasts from this point of view. The northern and the southern coasts are separated from one another by the entire extent of the Province of Nova Scotia with its coast-line of nearly 400 miles. This not only makes its northern and southern coasts difficult of access from one to the other, but it also brings it about that the southern coast is much more readily accessible from the countries lying to the south than is the northern, while the northern coast is somewhat more accessible from Europe than is the southern. This fact, as we shall see, has greatly affected the distribution and nationality of settlements in the Province.

c. Communication. New Brunswick is in general a country of low relief intersected everywhere by fine rivers. It has no true mountains, but has two considerable hill ranges (Map No. 3), one running north-east across the north central part of the Province, rising in extreme cases to near 2,700 feet in the interior and forming the Central Highlands, and a southern range following the coast, reaching nowhere an elevation of

1,500 feet, the Southern Highlands. Between them lies a triangular low plateau or plain country, the Eastern Plain, ranging from 500 feet elevation in the west to sea-level in the east, and north of them, occupying all the north-western part of the Province, lies a higher plateau, the Northern Plateau, some 800 to 1,000 feet in elevation. The entire Province is geologically and physiographically very old, so that the rivers have had time to cut deep channels and to extend their courses back, not only across the plateaus, but in many places across the hill ranges as well, finally interlocking at their sources, where access from one to the other is usually easy by short portages. The slopes of the rivers are, as a rule, not so great as to make them impossible or even difficult of navigation, so that a system of waterways navigable for canoes if not for boats ramifies everywhere through the Province.¹ The value of these rivers as lines of communication is so much the greater because all of the country between them is covered with a dense forest practically impenetrable for any distance, and frequently rough and hilly in addition. Further, the depth of most of the river valleys below the plateaus and highlands makes travel across their courses very difficult, especially for railroads, which commonly follow the valleys except when crossing the water-sheds between them, or the great eastern plain, which is so level and low as to offer no such obstructions. Another feature of great importance about the rivers is this,—their lower courses have been carried by geological causes beneath the sea, so that the tide flows up them frequently for long distances, allowing vessels to penetrate some distance from the coast. In this way, too, many excellent harbours are formed at the river mouths. These facts are illustrated on the accompanying physiographic map (Map No. 3). The ready communication between coast and interior allowed by these fine rivers, in the case of the St. John for ninety miles, has influenced the distribution of settlement in New Brunswick more than almost any other single factor.

An important feature of the river systems of the Province is their segregation, through physiographical causes, into distinct basins. Thus, several empty near together into Passamaquoddy Bay; a large number empty into the St. John and thus have a common meeting place at its mouth, and, to a lesser degree, at points along its course. Another group collects at the head of the Bay of Fundy, though here sub-divided into two minor systems; another group centres, but much less distinctly, in the Richibucto; several of much importance centre in Miramichi Bay; a few collect in Nepisiguit Bay; while several of importance centre at the head of Bay Chaleur. Thus it arises that the travel, trade and other important activities following the river valleys tend to centre in the

¹ Described and mapped in the earlier "Monograph of Historic Sites."

Province at a few localities, the geographical foci as it were; and at these places the principal settlements of the Province have existed from the pre-historic period to the present, and there also are situated the greater towns and cities to-day (compare Maps Nos. 3 and 13).

d. Climate. New Brunswick possesses a cool temperate climate, somewhat lower upon the whole than its latitude alone imposes upon it, a fact due to the prevalence of cold currents both of air and water, which, from meteorological causes prevail on the north-east coasts of this continent. Both temperature and rainfall vary somewhat in different parts of the Province, and there are the usual differences between the greater extremes of the interior and the more uniform conditions of the coast, but the Province does not rise to sufficient elevations, nor does it extend far enough north and south to show any great climatic variations, and such variations as appear are not great enough to have affected the distribution of settlement except in very minor features. The winter mean is about 18° F. with an extreme of -35° , while the summer mean is about 60° with a rare extreme of 96° . The mean annual precipitation varies in different localities from 35 to 47 inches annually, an amount sufficient to maintain the most luxuriant vegetation the temperature will allow. Though thus cold in winter, the climate is extremely healthy, and no indigenous diseases exist in any part of the Province.

With so cool a climate, late spring and early fall frosts are somewhat frequent and one of the chief foes of the farmer. This feature has affected settlement somewhat in that it has been an additional reason for the occupation of the ridges (a rather characteristic location of New Brunswick settlements), which are less liable to such frosts than the low ground. The great fertile Silurian Plateau in the north of the Province is especially subject to such frosts, which may greatly retard its ultimate settlement.

*e. Soils.*¹ Of the several factors connected with the natural wealth of New Brunswick the most important, and the most permanent in its effects, is the character of its soils. Of these the Province has a great variety, from the richest loam to the most sterile rock, and the distribution and qualities are represented on the accompanying map (Map No. 4). Richest of all are the reclaimed salt marshes at the head of

¹ On the soils of New Brunswick there is important matter in Johnston's "North America," and especially in his "Reports on the Agricultural Capabilities of New Brunswick," in Lugin's New Brunswick (see Bibliography), in a Report by Sheldon and Sparrow, published as a sessional paper by the Dominion Government in 1882 (?) and in many of the Geological Reports. A somewhat full treatment of the Westmorland marshes by the present writer is in the Botanical Gazette, Vol. 36.

the Bay of Fundy, which are not only wonderfully fertile but also remarkably lasting, producing great crops year after year without any care whatever. Even when they do finally degenerate their fertility can be renewed by admission of the tide. These marshes are well developed on the Shepody, at several points along the Petitecodiac, on the Memramcook, but reach their perfection on the great Tantramar marsh in the basins of the Tantramar and Aulac Rivers. These marshes have powerfully influenced settlement in New Brunswick, for not only were the first permanent settlements established beside them, but they determine some of the most prosperous farming settlements of the present day. Next after the marshes come the river intervalles, which are also naturally rich, and which have their fertility frequently renewed by the annual freshets. Second only to the marshes these intervalles attracted the early settlers, and they determine to-day some of the most prosperous of our farming communities. They reach their greatest development along the St. John, especially below Fredericton, but they are abundant also higher up that river, and on its branches, on the Restigouche, and to a lesser extent on many other rivers. Next in value come two kinds of upland soils, both of great fertility. The first are the soft red sandstones which occur very sparingly at Passamaquoddy Bay (St. Andrews), in the valley of the Tobique, and at the mouth of the Restigouche, determining the best farming settlements in those regions, while a band of this soil extends through the Province diagonally north-eastward, bearing several prosperous farming districts in its course. Of a somewhat different character and somewhat less fertile are some red sandstones in the south-eastern part of the Province, where they determine also some good settlements. Equally or more fertile, and far more extensive, are the calcareous soils occupying the northern and western parts of the Province, especially west of the line from Woodstock to Campbellton. On these rich upland soils occur the most prosperous upland settlements of the Province, including those west of the St. John in Carleton County. The sandstones of the great eastern plain make fair soils where the drainage is good, as it is for the most part near the coast; but where drainage is poor, as it is in the section between Grand Lake and the coast, great bogs and barrens develop and the soils are useless. Indeed areas of poor drainage are not infrequent elsewhere in the Province, notably in the south-western parts, where considerable bogs and swamps develop, making the ridges the only possible farming land. All of the above-mentioned soils have their characteristics determined by the underlying rocks, but in addition to these New Brunswick possesses great quantities of mixed soils laid down as the debris of glacial action.

Frequently ridges of such soils occur in regions otherwise of poor quality, and such ridges are particularly well marked in parts of Charlotte County; while smaller ridges and terraces are abundant throughout the Province, determining by their level, well-drained, elevated character the sites of many villages and innumerable houses. But all of the soils of the Province are not good, and there are extensive areas where the soils are so poor as to be agriculturally useless. Such is the case with a great part of the Central Highlands and the western part of the Southern Highlands. In both of these regions the underlying rocks are of such a hardness, in extreme cases granite, that they do not decay readily to form soil nor is the quality good when they do. Furthermore, the action of the ice of the glacial period carried these barren rocks in considerable quantities as boulders to the south-east, often covering and rendering useless much better soils. In this way are determined those great areas in the central, south-east, and south of the Province, which, as shown on our population map (Map No. 13), are entirely without population. These areas are not, however, useless, for they possess two values; they bear valuable forest, and with it a great quantity of large game.

An important phase of soil conditions with a bearing on settlement is the wearing out of thin soils, either from rapid natural exhaustion or through defective agriculture. This has caused the abandonment of many settlements in the southern part of the Province. But it is also true that many serious mistakes have been made in the location of immigrant settlements on poor soils, despite the fact that an abundance of good land has always been available.

The settlements determined primarily by soils are of course of the scattered sort, with little tendency to condensation except at the occasional trading centres which develop naturally in all farming regions. This is brought out clearly by the remarkably even distribution of population, shown in our population map (Map No. 13), in the typical farming sections of Carleton County and King's County.

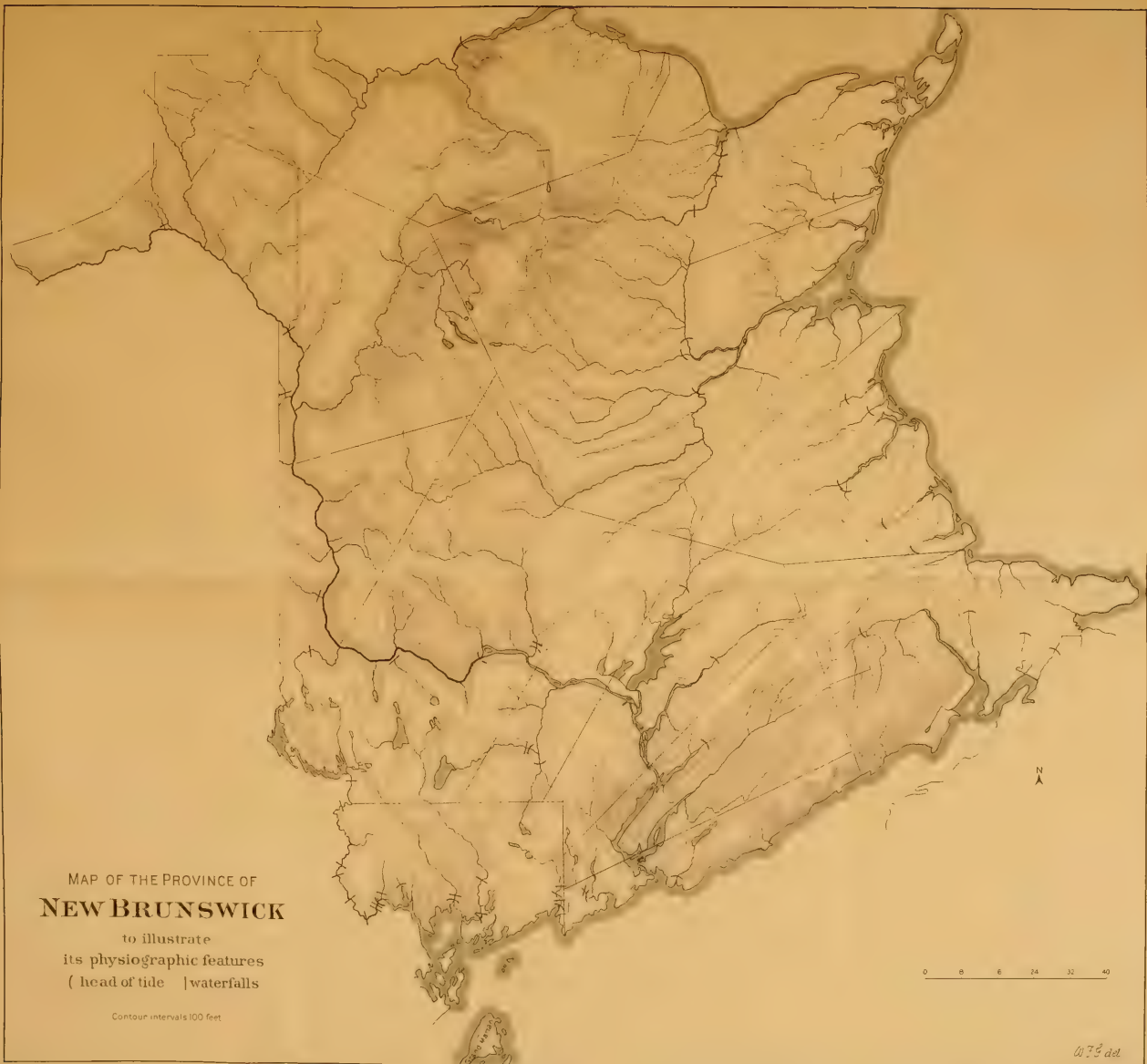
f. Forests. The conditions of temperature and precipitation, and as well of slope and elevation, are such in New Brunswick that practically every part of the land surface of the Province, excepting only some bogs, barrens and abrupt rocky hill-tops, is covered with a dense forest containing most of the valuable timber trees of the cool temperate zone, especially the white pine, the red spruce, the white cedar, the sugar maple, the paper birch with others of somewhat lesser value, the hemlock, beech, butternut, a few oaks and some others. The presence of this fine forest, practically alike through all parts of the Province, in conjunction with the many great rivers, has determined

the greatest of New Brunswick industries next after the cultivation of the soil; and some of the principal New Brunswick settlements lie at the centres of the lumber industry, which, naturally, are on the rivers at or near the principal seaports in the geographic foci of the river systems, a fact well brought out by a comparison of maps 3 and 13. The forest also determines some minor industries which we can better note later.

It happens unfortunately that through accident and mismanagement the forest has in places become temporarily exhausted, thus necessitating the abandonment or decline of formerly prosperous lumbering settlements, which has happened especially in parts of Charlotte County.

g. Fisheries. Next after the soils and forests New Brunswick's wealth lies in her fisheries, which are very rich both on the sea coast and in the inland waters. In the coast waters occur the cod, pollock, haddock, herring, mackerel and a few of lesser value. These occur widely scattered along the coast but are especially abundant in two regions, among and near the Islands of Passamaquoddy Bay and around Miscou and Shippegan, and it is in these two regions that the most numerous and prosperous fishing settlements occur. In other coast settlements, as along the North Shore, the sea fishing is an occupation supplementary to farming, and is not of itself alone determinative of settlements. Another form of fishery, the capture of porpoises, is of some local importance at Passamaquoddy, and the taking of the walrus or sea-cow was formerly an important industry at Miscou and elsewhere on the North Shore. Another form is the taking of shell-fish; lobsters are taken nearly everywhere on the coasts, while oysters occur, though in diminishing abundance, in many harbours of the North Shore, while clams have some local value, especially in Charlotte. None of these special forms of the fishery are, however, alone determinative of settlements though they supplement other resources.

Passing to the river fisheries, we find that the most important fish by far is the salmon, which runs into all the rivers of the Province, but especially into the St. John, the Miramichi, the Nepisiguit and above all the Restigouche, determining important fisheries in the tide waters of those rivers as well as a fishery for sport in their upper waters. Everywhere in the interior abounds the brook trout, determining, however, a fishery rather for sport than business and not determinative of settlements. Other important fish are the shad (particularly in Petitecodiac), gaspereau, sturgeon (formerly), bass, pickerel, eels and some others, most of them adding to the resources of settlements otherwise determined, but not themselves the causes of settlements.



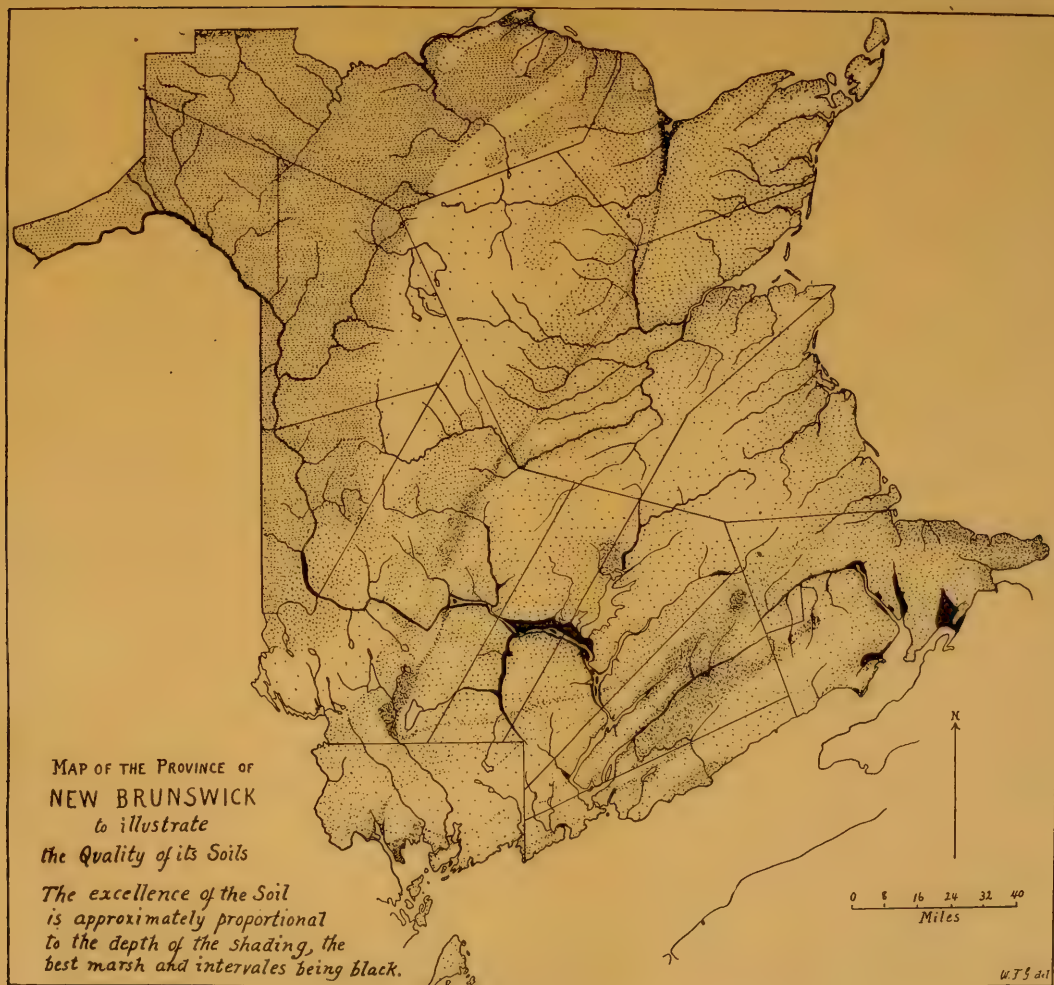
MAP OF THE PROVINCE OF
NEW BRUNSWICK

to illustrate
its physiographic features
(head of tide | waterfalls

Contour intervals 100 feet

0 8 16 24 32 40

W. B. ad.



h. Land Animals. The extensive forests of New Brunswick originally were inhabited by great numbers of the most valuable wild animals of the cool temperate zone, the great moose, together with the caribou, the virginia deer, the beaver, the black bear and the principal minor fur-bearing animals, and grouse, pigeons and other game birds. Like the forests themselves, these animals were so evenly distributed that while they had an important part in making possible the early settlement of the Province, they scarcely affected the distribution of settlements, excepting in so far as the fur trade tended to locate itself at the geographic foci of the river systems. The many lakes, streams and lagoons also maintained an abundant life of water-fowl, which aided much in favouring early settlement. With the advance of settlement, however, and the development of agriculture, the value of the wild animal life has proportionally lessened, though in recent years it is rising again into importance through its attractions to foreign sportsmen, a fact bringing environmental into contact with sociological phenomena.

i. Mineral Products. New Brunswick is very poor in known mineral resources; and settlement, therefore, has been little affected by this factor. Although numerous valuable minerals occur widely scattered in the Province, and many attempts have been made to find them in paying quantities, and although some ore deposits (antimony at Prince William, manganese at Markhamville, iron at Jacksontown), have been worked for a time, there is not in profitable operation to-day in New Brunswick a single mine of any of the metals. Thin seams of coal occur at many points in central and eastern New Brunswick, and are profitably worked on a small scale by local residents. But they are not of sufficient value or extent to have determined any distinct coal mining settlements, though attempts are now being made to work them on a scale, which, if successful, will result in distinct settlements. For a time the coal-like substance, albertite, was profitably mined at Albert Mines, but the supply is exhausted. Of equal or greater value are the fine gypsum deposits which occur at the Petitcodiac, where they are worked, adding to the considerable settlement at Hillsborough, and other smaller deposits are worked locally on the Tobique. The granite in the two great granite belts of the Province, but especially in the southern, is of fine quality and colour, so that it is profitably worked at Spoon Island on the St. John, and especially near St. George, the prosperity of which latter village is now dependent upon it. The sandstones of the eastern and northern coasts are of fine grade and were formerly worked at the head of the Bay of Fundy, as they still are on a

small scale at Miramichi and Bay of Chaleur. The local demand is, however, small, and a formerly prosperous business was destroyed, causing the abandonment of its settlements, by the imposition of high duties by the United States, another form of the modification of environmental by sociological factors. Limestone occurs at many points, but is only locally worked.

j. Water Powers. New Brunswick possesses a combination of moderate precipitation, moderate slopes from the interior to the sea, very numerous streams and rivers, and abundant obstructions causing water-falls at intervals in those streams. Thus result numerous, though few great, water powers, the principal of which are shown on the accompanying map (Map No. 3). These powers are utilized whenever near the mouths of streams yielding much lumber, determining settlements there (Marysville, Milltown and a few smaller places), but far the greater number of these powers now run to waste, mostly because the lumber has been exhausted in the rivers above them (as in Charlotte), or because they are situated too far from the sea for the profitable manufacture of lumber (as at the Grand Falls of the St. John, and of the Nepisiguit). There is as yet little demand for other forms of manufacturing, to cause their utilization in other ways. These water powers, however, are among the greatest potential resources of the Province, and important settlements will undoubtedly spring up in the future in their vicinity.

k. Tides. The tides of New Brunswick coast waters, though sufficiently remarkable from some points of view, appear so far to have had little direct effect upon settlement, although indirectly, through the building of the great marshes at the head of the Bay of Fundy, they have affected it powerfully. Nevertheless they should be reckoned amongst the potential wealth of the Province. It is altogether probable that the immense power developed by the swing of the 50-foot tides at the head of the Bay of Fundy, and to a lesser degree all along the coast, especially among the Passamaquoddy Islands, will in time be utilized, thus adding greatly to the settlement of those particular regions.

l. Natural Scenery. In its rugged sea-coast, its charming ripe river valleys, and its fine hills, New Brunswick possesses much beautiful, though little grand, scenery. This has hitherto hardly affected settlement, but it is coming to do so through its attractiveness to tourists and summer residents, an influence likely to increase in importance with time and to influence settlement to some extent. Such settlements, however, are not of an especially desirable kind, both because of their

intermittent character, and because of their effect on the character of the regular residents.

Such in general are the environmental factors which have determined the broader distribution of settlements as we find them in New Brunswick to-day. A comparison of the physiographic with the population map (Maps Nos. 3 and 13) will show how closely factors and distribution coincide. The population map, however, gives no idea of the nationality or age of the settlements, or other features of their history. To understand these, we must consider now all of the factors together, tracing their operation chronologically from the pre-historic period to the present.

PART II.—THE OPERATION OF THE FACTORS IN THE PRODUCTION OF NEW BRUNSWICK SETTLEMENTS.

1. THE PRE-HISTORIC (INDIAN) PERIOD (TO 1604).

The dawn of history in New Brunswick found this Province thinly peopled by two Indian tribes, Micmacs and Maliseets, living in the stone age, and subsisting exclusively, or almost exclusively, by the chase. Such settlements as they formed embraced a few semi-permanent villages, with many scattered and temporarily occupied camp-sites of various degrees of importance.

The locations of these places have been described and mapped, and the historical evidence relating to them has been discussed, in the earlier Monograph on Historic Sites (pages 217-259), while certain facts discovered since the publication of that work will be found in the Addenda to the present series. There can be no doubt that all of the village and camp-sites I have been able to discover form only a portion, and without doubt only a small portion, of the sites which existed in pre-historic times. For the North Shore and its rivers, the records are particularly scanty, and I have no doubt that large village sites and innumerable camp-sites existed there of which no trace remains. Even the evidence as to pre-historic settlements is largely inference from their conditions in historic times, and it may not be wholly correct. Certainly our map (Map No. 5), although marking every village and camp-site known to me, must fail to give any adequate idea of the number of sites which actually existed. The distribution of such as are known is shown in

the Province along the Gulf of St. Lawrence coast, while the Maliseets moved northward along the Atlantic coast. This would explain the distribution of their settlements as found by Europeans, for the Micmacs occupied, as they still do, all of the St. Lawrence slope with the contiguous region at the head of the Bay of Fundy, together with Nova Scotia, while the Maliseets possessed the St. John and Passamaquoddy systems, taking, it may be noted, the tribal name of Passamaquoddies in the latter region.

b. Relations with earlier and neighbouring races. If any earlier race ever occupied this Province, every trace of it has now vanished, and there is no trace of any influence upon the settlements from this source. As to the relations of Micmacs and Maliseets with one another, they have never within historic times been at war with one another, and the entire lack of enmity between them indicates that this mutual friendliness was of long pre-historic duration. Indeed, this fact in itself throws some light upon the mode of the original peopling of the Province, since it indicates that one race was not driven before the other, but that both moved peacefully into unoccupied territory. Hence their settlements appear not to have been influenced in character or location by need for defence against one another. As to neighbouring races, it is known that they joined together in early historic times for war against the Indians to the southward, and no doubt they had reprisals from them to fear. Further, they had an enemy of whom they were always in great dread, even terror, namely, the Mohawks, who undoubtedly extended their terrible forays into this Province. It was, no doubt, for defence against these enemies that they fortified their principal villages at *Meductic*, possibly at *Aucpac*, perhaps at *Nerepis*, at *Ouigoudi* (St. John), at *Richibucto* and at *Restigouche*. Fortification, however, meant in these cases nothing more than the building of a strong stockade; and no attempt seems to have been made to select a strong position, no doubt because this was of little consequence when no artillery heavier than Indian arrows was to be feared.

B. Sociological Factors.

a. Government. The Indian form of government was entirely tribal, with no central capital. But they had a certain substitute in their central meeting, or council, places, to which all the members of a tribe resorted once a year to discuss matters of common interest, to distribute hunting grounds, to consider peace or war with other tribes, etc. The chief requisites for such meeting-places were,—central position, ample camping ground, and sufficient game supply. The council place of the

Maliseets was in the eighteenth century at *Aucpac*, later at *Madawaska*, and probably earlier at *Meductic*, with possibly a subordinate one at *Conosquamcook* (St. Andrews), while that for the North Shore Micmacs appears to have been at *Skinouboudiche* (Burnt Church), and for the Micmacs at head of the Bay of Fundy it was probably at *Midjie*.

b. Occupations. The pre-historic Indians of New Brunswick had practically but one occupation,— hunting and fishing. Hence the locations of the settlements of the period are determined very largely by the best game localities, as will later be traced under the environmental factors. The fact that they were so well distributed over the Province, as Map No. 5 shows they were, is correlated with the wide distribution of game in the Province.

c. Racial character. The most striking feature of Indian character was no doubt their nomadic habit, which had been imposed upon them by their mode of life. This led them, despite a certain sociability of disposition inclining them to enjoy life together in villages, to wander incessantly in small parties, over the length and breadth of the land. Hence their numerous camp-sites, scattered throughout the Province at advantageous points, occupied for various lengths of time from a few hours to some weeks, and of all degrees of size and frequency of occupation, were more characteristic of their settlements than were the few semi-permanent villages. These camp-sites, large or small, were not haphazard spots occupied anywhere that night or a whim might be supposed to arrest their wanderings, but were perfectly definite places, occupied year after year. The reason for their definiteness was two-fold, first, the great difficulty of clearing new camp-sites from the dense forest with their crude tools, and second, the need for certain definite requisites, later to be noted, for a good camp ground, which requisites are not to be found anywhere, but only in certain places. Even the villages seem to have been only semi-permanent, since they were apparently often completely abandoned.

d. Religion. These Indians were, of course, entirely pagans, full of superstition, with no definite religious rites, and no sacred places. Hence their settlements were not affected in any degree by this factor, unless their known dislike for certain uncanny places, like the gorges below the greater falls, may have acted restrictively against settlement near such places.

C. Environmental Factors.

a. Location of game (hunting and fishing) grounds. Dependent almost entirely upon game for their subsistence, the locations of Indian village and camp-sites were determined by this much more than by any other factor.

From this point of view game is of four sorts. *First*, there is the large furred game, the moose, caribou, deer, beaver and some smaller forms, widely, and indeed uniformly, scattered all over the Province, and hunted not only for food, but for the furs indispensable for the Indians' clothing. These animals can be profitably hunted, not from large villages, but only by small parties moving continually, and hence this form of the chase determined not the larger, but those smaller sites, which were scattered very widely, even to the most remote parts of the Province, and many of which, still used by their white sportsmen successors, are indicated to us by the names Indian Lake, Indian Brook, etc. *Second*, there is that game, especially the waterfowl, which seeks certain definite locations at definite seasons, such as the waterfowl which resort to the great marshes and lagoons of the North Shore, to the great marshes and bogs of Westmorland, and to marshy lakes and meadows elsewhere; and such localities no doubt helped to determine some of the larger camp-sites, especially along the North Shore, and very likely some others, especially *Midjie* in Westmorland, and those on Maquapit and French Lakes. *Third*, there is the game which migrates or lives along definite paths at definite seasons, such as the great fresh-water food-fishes, the salmon, trout, gaspereaux and some others, and whose movement is, or may be, checked at certain favourable points, such as waterfalls, or tide-heads on the rivers, or in narrow thoroughfares between lakes. In such localities the conditions exist for camp-sites of large size and considerable length of occupation; and accordingly it is in such situations that we find most of the more important camp-sites and some of the village sites of the Province, such as those at Salmon Falls, *Kilmaquac*, and the Grand-Chepedneck (Lakes) falls on the St. Croix, at St. George, at Aroostook Falls, at *Maquapit*, at *Madawaska*, and at the mouths of most of the branches of the Upper St. John which enter the main river with falls or heavy rapids, at the mouths of the branches of the Miramichi and elsewhere. In fact, wherever on a considerable stream is a large waterfall or heavy rapid, and wherever the fresh water meets the tide with a fall or rapid, there one may with reasonable assurance look for a camp-site. *Fourth*, there is the game which occupies permanently a fixed position, and may be found practically at

any time, of which the most important were the eels, all the year round occupying definite pools and very acceptable to the Indian taste, and the various shell-fish. As to the former, they perhaps determined more than any other single game factor the sites of important camp-sites, and moreover, they seem to have had a great deal to do with the location of the semi-permanent village sites. Thus *Kilmaquac*, *Meductie*, *Skinouboudiche* (Burnt Church), and certainly several modern settlements, which are also probably pre-historic, such as *Nadouan* (Eel ground), on the Miramichi, and the settlement at Eel River in Restigouche, with no doubt others, are near important eel pools and located there for this reason. As to the shell-fish, the most important on the Fundy coast are the great clam-beds everywhere abundant in the coves and harbours; and numerous important camp-sites marked by great heaps of clam shells, as listed in the "Historic Sites" Monograph, were thus located about Passamaquoddy and thence towards St. John. On the North Shore the principal shell-fish was the oyster, and no doubt the extensive oyster beds along the lagoons of that coast determined the locations of many extensive camp-sites there, although, owing to the rapid sinking and washing away of that flat coast, these sites have largely disappeared.

Another form of the chase, hunting rather than fishing, which determined certain camp-sites was the pursuit of the porpoise, which no doubt produced aboriginal, as it has modern, camp-sites on Grand Manan, at Lepreau and elsewhere near Passamaquoddy; and perhaps the sea-cow, or walrus fishery had a similar influence on the North Shore, though as to this there is no evidence.

The importance of any given camp-site was of course determined largely by the number of factors contributing to establish it, and the largest sites, together with the village sites, were the cumulative result of a number of favourable factors.

b. Lines and junctions of communication. New Brunswick was originally densely forested, with a forest of such a close tangled character as to be penetrable only with much labour. On the other hand the country is everywhere penetrated by fine rivers, mostly navigable for the light Indian birch canoes, and coming so near together at their heads that they are easily brought into connection by short and level portage paths. Hence aboriginal travel was exclusively along these rivers or the sea-coast, and there existed a perfect network of routes of travel throughout the Province, a system mapped in the frontispiece to the Historical Sites Monograph. Travel being entirely along the waterways, the Indian village and camp-sites were situated along them also; and, as the map will show, this was their exclusive position, and there

is not an ancient camp-site known to me away from navigable waters. Furthermore, other things being equal, since the Indians in the same vicinity naturally tended to camp together, the largest settlements developed on the largest and most frequently travelled rivers, the trunk lines, as it were, of travel. Most important of all were those village sites which occupied the intersection of the great trunk lines,—such as *Meductic*, at the intersection of the St. John with the great route to the south; or *Conosquamcook*, *Ouigoudi*, *Skinouboudiche* at the intersection of coast with river travel, while nearly equally important were those lying in the focus of a great river system, as *Restigouche*. The intersections of navigable rivers would be favourable places, which no doubt helped to locate the sites at the mouths of the main branches of the St. John, as *Madawaska*, and of the Miramichi, and no doubt, too, established some now unknown on the *Restigouche*. Camp-sites of some importance too, at which the Indians might rest before beginning or after completing the labour of the portage, usually occurred, and occur to this day, in the wilderness parts of the Province, at both ends of a portage route, and were the larger in proportion to the importance and the length of the carry. This determined the considerable site at the north end of the Washademoac-Petitcodiac Portage, helped to give importance to *Meductic*, and located innumerable smaller sites throughout the Province.

c. Location of favourable camp-grounds. The pre-historic Indian, living so closely in touch with his environment, drawing his supplies direct from their natural sources, and forced to meet the hardships of hostile nature with little artificial mitigation, was more closely dependent upon convenient physical surroundings for his habitation than are his more resourceful successors, who have learned to a great extent to control their environment. Hence favourable spots for the actual erection of the habitations played probably a larger part in the location of the pre-historic than of any later settlements.

The great requisites of a good camp-site were these: *First*, a well drained level and dry situation, beside the water, for which the high intervalles or low terraces frequent along our rivers were ideal. It is upon them more than upon any other situation that the camp-sites are located. *Second*, nearness of a good spring. In camps by the salt water this is of course indispensable, but it played a great part in the location of camp-sites along the rivers; for not only does the spring not freeze in winter, but even in summer the Indians, although beside the clearest of rivers, prefer spring water whenever it can be found, and to this day will take much trouble to obtain it. Most large camp

sites known to me are near good springs, and it was no doubt the splendid great spring at *Meductic* which helped to fix the settlement there. Springs are so abundant in New Brunswick, however, that most situations otherwise good are provided with one or more at no great distance. *Third*, a good supply of firewood. No doubt the Indian, with his imperfect tools, made much use of drift wood and of fallen and dry timber, and such is much more abundant on uplands than upon intervalles, from which it is largely washed away in the spring freshets, and where it is commonly wet. When driven to the use of greenwood, he found the best kinds, paper birch and sugar maple, upon the uplands. Hence probably one reason why the camping grounds, if on intervalles, were usually near to uplands. *Fourth*, a good beach for landing and beaching canoes, for which beaches of sand or fine gravel were best, especially if, on rapid rivers, they were in some cove or below some point giving protection from the current. Many of the best camp-sites known to me are beside such beaches. *Fifth*, the proximity of a grove of the canoe or paper birch, from the bark of which the Indian made not only his canoe and his wigwam (at least in part or at times), but also his dishes and other household utensils, while its bark formed the best of materials for starting his fires, especially with wet or otherwise poor fuel, and its green wood forms the very best green fuel afforded by the New Brunswick woods. No doubt the proximity of groves of this invaluable tree helped to fix some of the larger camp-sites, whilst it is altogether probable that some smaller sites were located in the vicinity of good groves visited only while the bark was being obtained for canoe-building, etc. Another valuable tree to the Indian was the ash, from which he made his baskets and other articles, while another was the white cedar, from which he made the lining and ribs for his canoes, and shoes to cover their bottoms when travelling at low water. The proximity of these trees would, of course, co-operate with other factors to fix the sites of important camping grounds. *Sixth*, a commanding position, especially at the end, or better, the intersection of long open river reaches. Such a position had advantages partly in that it permitted earlier knowledge of the approach of friend or foe, and partly because, by exposing the camp to the breezes which blow along such reaches, it lessened the plague of insects which were and are the greatest annoyance of the summer dweller in wilderness New Brunswick.

Among minor attributes of a good camp ground would come, no doubt, in the cases of the semi-permanent village sites where some rude cultivation was probably attempted, the presence of good lands. Now the easiest and best lands to cultivate along the rivers of New Brunswick

are the intervalles, and it was probably in part for this reason that *Meductic*, *Aucpac* and *Restigouche* were on or very near good intervalles. Another minor merit would be the presence of tall trees, affording shade from the summer sun and shelter from the winter winds. For this purpose nothing is better than the white pine, which grows upon dry river terraces, especially along the Miramichi, where the Indians to this day delight to camp beneath its shelter. Another advantage, particularly for winter, would be an easterly slope, permitting the camps to receive the first warming and drying rays of the rising sun, while for winter camps, also, a high hill or bank to give shelter from north and north-west winds would be most desirable.

Such were the attributes of a good Indian camp ground. Of course the general situation of any given site was fixed by other factors, especially proximity of game, etc.; but the approximate position being thus fixed, the precise location would be determined by the nearest spot which combined in the largest measure those various advantages. Of course they would not all be present in one place, but the location of any particular site would be determined by the spot which could offer the best combination of them.

The ideal Indian camp-site was one which stood at the intersection of two important rivers, at the head of the tide, near the focus of a large river system, and it looked eastward along a great reach of hill-bordered river; near it were waterfalls and eel pools and beds of shell-fish; it stood upon a low gravel terrace shaded by a few tall white pines, sloping away gently to a sandy beach, while behind it rose a birch-covered hillside sending forth gushing springs. Here, on soft autumn days the Indian lived the simple healthful vegetative life of pure content, such as the man of civilization knoweth not, save when he, too, leaving the life of the towns, goes back to primitive ways and leads the life that Nature approves.

d. Positions free from insect pests. A great impediment to summer life in the New Brunswick wilderness is the annoyance from insect attacks, which often become so serious as to render life there almost unbearable. This appears to have had an effect upon the Indian settlements, not only in causing their location upon the breeziest river reaches, but also, more fundamentally, in helping to send the Indians to dwell in summer in camping grounds by the sea shore, when they occupied those situations now marked by the great shell heaps at *Bocabec* and other places at Passamaquoddy and elsewhere. It is, however, not certain that these seaside camps were abandoned entirely in winter, though it seems likely they were more largely occupied in summer than in winter.

e. Situations of great natural charm. The Indian was forced by the necessities of his hard mode of life to be practical in his selection of camp grounds, but I am of opinion from what I know of his disposition as well as from the location of the principal sites, that, other things being equal, he had a marked preference for situations of marked natural charm, and tended to locate his camp there. At all events the principal camp or village sites of the Province are in the positions of greatest natural beauty the Province can show, as witness *Conosquamcook* (St. Andrews), *Madawaska*, *Aucpac*, *Restigouche* and others.

f. Situations of tool-quarries. The Indians made their tools, especially arrow-heads, knives, etc., of flint or chalcedony, and they camped at times where such material could be found. One such camp-site is known on Washademoac Lake, as described recently by Dr. G. F. Mathew.¹ Probably there are others, and no doubt there were camp-sites on the Tomogonops to which the Indians resorted for their pipe-stone.

D. Summary.

Such appear to be the factors determining the locations of the pre-historic settlements of New Brunswick. They explain why, in this period, the village sites were so few but were located in the important places they were, and why the camp-sites were so numerous, of such diverse degrees of importance, and so widely scattered. It is notable that the factors here important are almost purely environmental, the historical and sociological factors so dominant in the later periods being as yet of comparatively slight importance. If we ask now in what ways this pre-historic distribution affected the distribution of settlements to-day, there seems to be but one matter to be mentioned,—some of the sites, occupied more or less continuously through historic times by the Indians, determined the locations of present Indian reservations, as will be found noted later in this work. Otherwise our settlements are located as if those of the Indians had never been.

2. THE PERIOD OF DISCOVERY AND EXPLORATION (1492-1604).

No settlements were made in this period within the limits of the present New Brunswick, but the course of events during this time profoundly affected not only the distribution of settlements later, but also the entire history of the Province down to the present day. Obviously only historical, and not sociological or environmental factors are here in operation.

¹ In these Transactions, VI, 1900, iv, 61.

A. Historical Factors.

a. Voyages of Cabot, Verrazano, and Cartier. In the course of human history it came to pass that man became civilized in the eastern hemisphere and extended thence to the western. The voyage of Columbus in 1492 opened in reality a new world to the exploitation of the old. In order to profit by the new discovery England, in 1497, sent John Cabot exploring to the westward, and upon this voyage and upon another the next year he, or his son, discovered and explored the north-eastern coast of North America. On this foundation was based England's claim to all that vast and important region, but Cabot's failure to bring back promise of immediate riches, together with the condition of domestic affairs in England, led to the neglect of his discoveries, whereby they fell into oblivion, their original records were lost and only the vaguest knowledge of their location and extent became known to the world. Other nations also desired to share in the value of the western discoveries and sent out exploring expeditions. None of these, however, had results of any concern to our present subject until that of Verrazano, under the auspices of France, in 1524. On this voyage, as nearly as the records enable us to judge, Verrazano explored the very coast followed by Cabot a quarter of a century earlier. Verrazano, however, through maps and reports, made his discoveries very much better known than Cabot had made his, and Verrazano's voyage appeared to the French to give France a better claim to the possession of this region than was given to England by the almost unknown, very indefinite and practically forgotten, explorations of Cabot. This circumstance of the dual claim of these two powerful nations to the same country, each perfectly sincere in its belief in its rights, was immensely important to the subsequent history of this part of America. Not only did it powerfully affect the entire course of subsequent settlement, but it brought it to pass that English and French live side by side in New Brunswick to-day. Nor did the efforts of France end here, for in 1534 and later she sent out Cartier and others who explored the St. Lawrence, and incidentally a part of the North Shore of New Brunswick.

b. Voyage of de Monts to Acadia. Later in that century England awoke to her interests in America, but, turning her attention especially to Newfoundland and Virginia, she neglected the region between, which remained unoccupied and almost unknown. It was this unoccupied country that, in 1603, France planned to exploit. In 1604 the Sieur de Monts was made Governor of all the American coast from Cape Breton to the present Pennsylvania, and was sent with a well-equipped expedition not only to explore, but to colonize it. This expedition made its

landfall at La Heve, explored a part of the eastern coast of Nova Scotia and the Bay of Fundy, and, having viewed somewhat superficially the coast nearly to Kennebec, finally fixed upon St. Croix Island (now Dochet) as the site of their principal settlement in Acadia, thereby inaugurating not only the permanent settlement of Acadia, and indeed of all Canada, but at the same time making the Bay of Fundy the centre of French operations and power in Acadia. It is true the settlement was the next year removed to Port Royal, but this also is on Fundy waters. Would the history of eastern America have been very different had the sails of this expedition been trimmed for Massachusetts Bay instead of for the coast of Nova Scotia?

Thus it was the French who first discovered and explored both the northern and southern coasts of New Brunswick, and who, according to all rights based upon such a beginning, should possess New Brunswick to-day. But in the background hovered England, with her shadowy Cabot claim and with something vastly more important,—a vigorous race impulsive for expansion and gifted with a genius for domination. In 1613 the English first interfered in Acadia and began that series of struggles between the two races in America which only ended when French Acadia became the British Provinces of to-day. But, though France lost Acadia wholly, the French race did not, for a large and increasing French (Acadian) population exists in New Brunswick to-day.

3. THE ACADIAN PERIOD (1604-1760).

This period of New Brunswick history opened in 1604 with the attempt of the French to colonize Acadia. It closed with the beginning of the New England Immigration in 1760.

The locations of the settlements formed in this period have been described and mapped, and the historical evidence bearing on the subject has been discussed, in the earlier Monograph on Historic Sites, pages 262 to 320, and such additional facts as have since been discovered will be found in the Addenda to the present series. The principal locations of settlements, forts and land grants are shown in synopsis on the accompanying map (Map No. 6), while the factors determining their distribution are as follows:

A. Historical Factors.

a. Attempt to settle Acadia through trading companies. In 1603 the French began their attempts to settle and exploit Acadia. They adopted the system of granting extensive privileges to trading companies

which supplied the means for the formation of settlements made under the command of Governors appointed by the King. The first of these settlements was the carefully-planned colony on *St. Croix* (Dochet) *Island*, founded by de Monts in 1604, which was expected to form the capital of Acadia. An abnormally severe winter led to its removal the next year to Port Royal (Annapolis), which thus became, and, except



MAP No. 6.

for a temporary interval, 1690-1700, when it was on the St. John, remained for over a century the capital of the French and the centre of their operations in Acadia. The first settlement to be formed under this system within the present Province of New Brunswick, aside from the temporary winter village of *Emenenic* on Catons Island and a minor fishing establishment formed in 1623 on *Misco* Island, was the strongly fortified trading post built at the mouth of the St. John in or prior to 1632 by the *Sieur de La Tour*, which, granted him by the Company of

New France in 1635, later became the famous *Fort La Tour* destroyed by Charnisay in 1645 and reoccupied by La Tour in 1651. The company-system was a failure, chiefly because it subordinated genuine settlement, involving agriculture, to the quicker returns of the fur trade, and it produced no farther effect upon settlements in New Brunswick.

b. The Foundation of Nova Scotia. In 1613 the English, claiming the country by virtue of the Cabot discovery, seized Acadia; and in 1621 King James I. granted the entire country to his favourite, Sir William Alexander. Alexander attempted a settlement near Port Royal but none in the present New Brunswick, and in 1632 Acadia was returned to France. In 1654 it was retaken by the British, who established a trading post at *Jemseg* in 1659 and another of unknown site at the head of the Bay of Fundy. The country was restored to France in 1667, but retaken in 1690, restored to France in 1697 and retaken finally in 1710. These later periods of possession, however, produced no English settlements within the present limits of New Brunswick.

c. Early attempts to Christianize the Indians. The French were devout Catholics, and in their colonization ever attempted to Christianize the natives. To this end they early established missions in New Brunswick, of which the more important were,—those of the Recollets on the St. John (site unknown) in 1619, and at *Nepisquit* in 1620; the Jesuit Mission of *St. Charles de Miscou* in 1634 and another at *Nepisquit* in 1644. Later the Jesuits in particular established missions at or near the principal Indian villages such as *Meductic*, *Aucpac*, *Skinouboudiche* (Burnt Church), *Restigouche*. Such missions, however, hardly affected the French settlements.

d. Attempt to settle Acadia on the seigniorial system. The company system having proved a failure, the French Government undertook to replace it by the seigniorial system, under which extensive grants of land were made to seigniors who were bound to settle them with tenants upon the familiar feudal plan. This system was really begun by the great trading company of New France itself, which made several seigniorial grants, of which the only ones resulting in settlements were the seignior and fort at the mouth of the St. John to La Tour in 1635, and the entire north shore of the Province to Nicolas Denys in 1636 (confirmed 1653), who founded temporary trading posts at *Miscou* in 1652 and at *Nepisquit* somewhat later. But in 1672 there began that series of great seigniorial grants in New Brunswick, at first from the company of the West Indies (successor to the company of New France) and later from the King, which assigned thirty important seigniories, covering most of the best accessible lands in New Brunswick (Map No. 6) to French seigniors. In only a few cases was even an attempt

made to introduce settlers and the system as a whole was a failure. Under it, however, were formed the small posts, usually fortified, of *St. Aubin* and *Chartier* at Passamaquoddy, of *Martignon* at Carleton, of *Soulanges* at Jemseg, and *Freneuse* at Maugerville on the St. John, of *La Vallière* at Chignecto, of *de Chauffours* at Richibucto, of *Fronsac* at Miramichi, and of *Enaud* at Nepisiguit. None of these, however, proved permanent, though that of La Vallière at Chignecto was by far the most prosperous and populous, and it was only terminated by the troubles leading up to the expulsion of the Acadians.

e. The Introduction of the Acadian People. In 1632 the French received Acadia back from the English, and proceeded actively to exploit it. In 1633 de Razilly, commander in Acadia under the company of New France, brought from France the first of those peasant farmers who, joined by others later, founded the Acadian people, and gave to Acadia an industrious, tractable, devoutly religious and loyal population. They settled first at La Heve, but later removed to Port Royal and, increased by occasional new arrivals and by their own rapid multiplication, they spread, apparently as independent settlers, to *Chignecto* and *Beauséjour* (Amherst and Sackville) (1671), to *Shepody* (1698), to *Petitcodiac* (1698), and to the *St. John* (after 1700), while a few scattered individuals reached *Passamaquoddy*, *Miramichi*, *Miscou* and *Nepisiguit*, though in these latter cases it was not as independent settlers, but as tenants or servants of the seigniors. Such was substantially the position of the Acadians, when, in 1710, England and France being at war, the English seized Port Royal, and Acadia passed for the last time into the possession of England.

f. The divided allegiance of the Acadians. The cession of Acadia by France to England, with the transfer of the allegiance of all its French inhabitants who chose to remain there, marks the most important event and the most vital turning point in the whole history of the Acadian people. The "Acadia within its ancient limits" ceded by the treaty of 1713, was believed by the British to include all of the present Nova Scotia, excepting Cape Breton, and all of New Brunswick, with that part of Quebec north of New Brunswick to the St. Lawrence; but it did not include Isle St. John (Prince Edward Island) and Cape Breton. The French, however, claimed that the Acadia of the treaty included only the peninsula now called Nova Scotia, and that all of the mainland (including the present New Brunswick), was a part of New France and still belonged to them. This matter of boundaries was further complicated by a claim raised by the French a few years after, by which they held that Acadia included not even all

of the peninsula but only its southern watershed, though Port Royal, mentioned by name in the treaty, was admitted to belong to the English. Naturally these claims influenced the attitude of the Acadians, who must have believed that all of the present New Brunswick belonged without question to France, and that very probably all of the Bay of Fundy slope of the peninsula, including most of the important Acadian settlements, belonged to her also. Further, the failure of England to colonize Acadia, the recollection of the numerous times that their country had been returned to France after English conquests, the influence of their leaders who hoped for, and doubtless expected, its ultimate restoration, and their natural ties of kinship, language and religion all combined to make them loath to accept British rule, while their intense devotion to their native Acadia made them equally loath to leave the Province. On the other hand the English, believing fully in their right to the entire country, and convinced that it was to be permanently British, expected the Acadians to become British subjects. This became the more imperative in their minds not only because the country needed the Acadians as settlers, but also and especially because the intensity of their attachment to France in conjunction with their great numerical strength (now several thousands), made them a standing menace to British rule in Acadia in case war should again break out between the two nations. Thus the British naturally attempted to make the Acadians genuine British subjects, and, just as naturally under the circumstances, the Acadians attempted to evade this result; and hence the two races in Acadia, instead of coming closer, drifted farther apart. Finally the disputed points as to the boundaries of Acadia were referred to a commission, pending whose decision England left France in undisturbed possession of the mainland, and during which time the Acadian settlements were extending slowly on the St. John, (locations not known) and more rapidly north of the Miseguash, resulting in the foundation of *Beauséjour*, *Westcock*, *Prée des Bourques*, *Prée des Richards*, *Tintamarre*, *La Coupe*, *Le Lac*, *Portage*, *Baie Verte*. The French endeavoured to make good their claim by the construction of five forts, at *St. John*, *Nerepis*, *Beauséjour*, *Gaspereau* and *Shediac*. But the boundary commissioners were unable to agree, and, England and France being once more at war, the English in 1755 captured all the French forts and thus took forcible possession of the mainland, including all of the present New Brunswick.

g. The emigration of the Acadians. The friction engendered between the British and the Acadians through the refusal of the latter to become British subjects, led, towards 1749, to some emigra-

tion of Acadians from the peninsula of Nova Scotia to the mainland, then practically French territory, as well as to the French possessions at Isle St. John and elsewhere. The emigration was favoured by the French authorities, and in 1750 it reached considerable proportions, culminating in the total abandonment and destruction by the Acadians themselves of their large and prosperous settlement of Beaubassin, and their retirement north of the Missequash into the present New Brunswick. This emigration was important for New Brunswick, for it greatly increased the Acadian population in that Province, not only (temporarily) in the settlements near Fort *Beauséjour*, and at *Memramcook*, *Petitcodiac*, and *Shepody*, but as well it sent many of them to reside on the *St. John*, to *Shediac*, and perhaps also to *Miramichi* and possibly other points along the North Shore.

h. The Expulsion of the Acadians. In 1755 the British became masters of all Acadia, including the present New Brunswick, and, turning to the Acadians, still vastly outnumbering them and intensely loyal to France, gave them one more opportunity to take the oath of allegiance as British subjects. This the Acadians refused, and the English, at war with France, and feeling British rule in Nova Scotia menaced by the presence of a great body of sympathizers with the enemy, resolved upon and carried out a drastic war measure,—the expulsion of the Acadians from the country, and their transportation to the other British colonies where their presence would not be a danger.¹

¹ This was the real origin of the expulsion of the Acadians. It was simply a war measure, horribly cruel, because that is the nature of war, but justified by the first law of nations, national self-preservation. From the earliest times down to this day the necessity for self-preservation has been held by all nations to justify a resort to the extremest measures when these seem necessary. It is of course an entirely separate question whether this measure (the expulsion of the Acadians) was really necessary; it is very easy to be wise after the event, and, in these peaceful times, to prove to our satisfaction that the expulsion was quite needless on this ground. But this is not the point; the vital consideration is this, that it did seem to the rulers of Nova Scotia to be necessary, and therefore they did it. It is a hopelessly narrow view of the course of history which can see such an event as the Expulsion inspired primarily by a cruel hatred of the British for the Acadians, or by a selfish desire for the possession of their lands and property. The springs of the British action lay deeper, very far deeper, than this. It is not Lawrence, nor the British of his day, who are to be blamed for the cruelty of the Expulsion, but the implacable spirit of war which inspired them to it. This spirit is not yet extinct, but even to this day dominates the policy of nations, which, with little humour and much hypocrisy, claim to be great, civilized and Christian. Let us at least be honest with ourselves, and lay the blame for such events as the Expulsion where it belongs, not upon the enemy of the moment, but upon the war spirit which we still permit to dominate us.

i. The Outlawry of the Acadians. The attempt to transport the Acadians in 1755 from their chief centres of population to the American Colonies was effected with much expedition and efficiency, but it was not a complete success. It did, indeed, practically obliterate the Acadian population from the peninsula of Nova Scotia, but at Beauséjour and vicinity, and as well at Memramcook, Shepody, and Petitcodiac, the Acadians mostly escaped to the woods and the English had to be content with the total destruction of all their buildings and crops. On the St. John the Acadians appear not to have been disturbed at this time, doubtless because of their small numbers and few and scattered settlements. These numerous fugitives, now to the English no more than outlaws, were soon joined by others who had escaped from their transports or had managed by some means to return from their southern exile, and, while some of them removed to the other French possessions, most of them attempted once more to settle in the present New Brunswick, doubtless thinking that it at least would remain French. Accordingly they formed considerable settlements along the St. John (at localities for the most part well known to us from Monckton's Journal and Map of 1758) and upon the Petitcodiac, (probably at *Babineau* in Coverdale and perhaps upon the sites of their former settlements).¹ But most of them retired to the North Shore, where, apparently, they settled in small numbers at *Shediac*, *Cocagne*, *Buctouche*, *Richibucto*, and no doubt elsewhere in the smaller harbours along the coast. Their principal settlement, however, was on the Miramichi, where, at Beaubear's Island and vicinity they formed a settlement (*Boishébert*) protected by batteries at French Fort Cove (and perhaps at the island itself), of over two thousand people, and there were probably settlements at Bay du Vin, Burnt Church, and perhaps also elsewhere about the bay. The Acadians at Beaubear's Island suffered greatly from famine, despite aid sent them from the French Government at Quebec, so that in 1757 many of them retired nearer to Canada, founding probably the town of *Petit Rochelle* and a village on the site of Campbellton, near the head of navigation on the Restigouche. They did not, however, remain inactive in their new settlements, but, fitting up privateers, they attacked the English vessels, and joined with the Indians in harassing the British settlements. These proceedings were natural enough to them under the circumstances, but they confirmed the British in their idea that there could be no safety as long as any Acadians remained in the Prov-

¹ It is possible also that at this time some of them settled at Passamaquoddy, forming small settlements now marked by the cellars, reputed French, at Hills Point in Oak Bay, as well as at some points in Cobscook Bay. Possibly the Battery, locally said to have stood on Sandy Point, was formed at this time as a protection to the settlement above.

ince. Accordingly, in 1758, powerful armed expeditions were sent against their settlements on the St. John, Petitcodiac, and Miramichi which thoroughly destroyed those settlements, with probably Shediac and others along that coast, and dispersed the inhabitants. As a result they retired higher up these rivers and to other places beyond the reach of English ships. Thus originated, no doubt, the Acadian settlements above St. Annes, those on the *French Lakes*, and in other retired places on the St. John, including perhaps, on Little River, Sheffield, together with some on the Petitcodiac above Salisbury, at the Forks of Turtle Creek (*Fourche à Crapaud*) and Butternut Ridge, all above the navigation of vessels on the Petitcodiac, and probably small settlements on the upper part of the Memramcook. It was likewise at this time no doubt that the reputed French settlement, now marked by cellars, on the Miramichi above Doaktown was formed, and it is quite likely that the settlers in refuge in 1760 at Buctouche and Richibucto were also settled some distances up those rivers. But their chief refuges were at *Nepisiguit*, and especially on the Restigouche, at *Petit Rochelle*, where, in the latter case no doubt they thought themselves undoubtedly within the limits of French territory. But even here they were not safe, for in 1760 an English fleet in pursuit of a French squadron destroyed Petit Rochelle. During all these years the Acadians were an outlawed people, and any of them who remained in New Brunswick were there simply because the English were unable to remove them. In 1759 and 1760, however, the Acadians on the St. John, and those on the Petitcodiac, Memramcook, Buctouche and Richibucto made their submission to the English, and were permitted to remain temporarily where they were settled, or to reside for a time near Fort Cumberland. The next year, 1761, however, many of the latter, together with others who came to the Fort, were removed to near Halifax and elsewhere; and later in the same year over 300 who had not submitted or who had withdrawn from submission, were removed from Nepisiguit. But thenceforth they were left undisturbed in their places of refuge. Thus the Acadian population of the present New Brunswick was reduced to a few remnants, mostly scattered among the harbours of the North Shore, probably not exceeding a few hundreds in all. But in 1763 the Treaty of Paris was signed, transferring all Acadia with Canada to England, and a new era dawned for the Acadian people.

j. Relations with earlier and neighbouring races. The relations of the French and the Acadians with other races were two-fold, first with the English, and second with the Indians. As to the former, there was a condition of hostility for over a century and a half, leading to the building in New Brunswick of several forts, *St. Jean*, *Nashwaak*,

Jemseg, *Nerepis*, *Beauséjour*, *Gaspereau*, *Shediac*, minor posts at *Pont à Buot*, probably *St. Mary's Point* and *Fort Folly Point*, and of strong batteries at *French Fort Cove* on the *Miramichi*, at *Point Le Garde* and *Battery Point* (in *Quebec*) on the *Restigouche*, and possibly at *Nid d'Aigle* on the *St. John*. It was quite another phase of defence which led, to the great strengthening (though not the original building) of the first fort at *St. John*, *Fort La Tour*, viz., civil war between *La Tour* and his rival *Charnisay*.

In their relations with the Indians, the French, by fair dealing, a certain sympathy with their character, and the influence of the priests, won their friendship from the start. The French, like the English later, seem never to have recognized any right of the Indians to the soil, but extended their settlements as they pleased, with the passive acquiescence of the Indians. Because of this mutual friendship, the French settlements were located by other factors than the need of defence against the Indians, and they spread unhampered by any restriction from Indian hostility. The settlement at *St. Croix Island*, in 1604, alone seems to have had its position located in part by fear of Indian hostility, a groundless fear as it later proved. On the other hand there was actually some tendency for the smaller French settlements to be formed near the Indian villages, partly for environmental reasons, but also because of the facilities thus offered for trade, and because Indians and French could thus use the same churches and be served by the same priests. Such a double settlement was that at *Burnt Church*, and no doubt there were others in the Province.

B. Sociological Factors.

a. Government. Acadia was settled by the French entirely under the feudal system in which the Government resided wholly in the officially appointed governors and seigniors, the people having no part whatsoever in it. We have already considered the reasons which made the Bay of Fundy the centre of French operations in Acadia and which made *Port Royal* the capital. It remained the capital throughout the Acadian period with the exception of ten years, when, under the stress of foreign invasion, it was removed to the retired positions at *Jemseg* (1690-1692), to *Nachouac* (1692-1698), originating *Fort St. Joseph* there, and to *St. John* (1698-1700). Hence the settlement of the present New Brunswick was hardly at all affected by this consideration.

b. Occupations. The occupations of the French settlers of Acadia fall rather sharply into two groups, farming and trading. The farmers, the real Acadian people, and always the strength of Acadia, were set-

tled upon the best lands and formed the farming settlements to be considered below. The traders dealt with the Indians chiefly for furs, and, as their posts frequently contained goods of much value, these posts were commonly fortified, and they were built at the foci of the converging lines of Indian travel in localities to be noted below. The fishery did not rise into any great importance at this period, though the taking of cod and walrus (sea-cow) helped to create some of the minor settlements.

c. Racial character. The character of the French is not favourable to success in pioneering. They have much love for adventure in strange parts, and hence have made good explorers, but it is not combined with that passion for greater material prosperity, or that strong individualism and initiative, necessary for genuine pioneers. They, and especially the peasantry, are rather a home-loving and sociable people. This tended in Acadia, in conjunction with religious influences, to act concentratively on their settlements, and to keep them in compact villages. This was a marked feature, as it is to this day, of the Acadian settlements. The love of home so strongly developed in the Acadians, had another very important consequence upon settlement in New Brunswick, since it led so great a number of them, during the repatriation, to return from their foreign places of refuge to their beloved Acadia, thus greatly increasing the French population, especially on the North Shore, a subject later to be noted in detail.

d. Religion. The French in Acadia, especially the Acadian people, were devout Roman Catholics, closely attached to their church, and very obedient to the priests. This had a tendency to keep the Acadians in compact communities centering about the churches, and, in conjunction with the social and home-loving disposition of the people, made Acadia a land of agricultural villages, without that broad fringe of pioneer outposts so characteristic of Anglo-Saxon communities.

C. Environmental Factors.

a. Accessibility. As to ease of access from France, there is little difference between the Bay of Fundy and the North Shore, and it was historical circumstances, already considered, which made the Bay of Fundy the theatre of French activity in Acadia. The difficult access of the north from the south coast played an important part after the expulsion, since it made the North Shore relatively safe from the English, who were established at Annapolis, and hence the French refugee settlements were largely made in the former region.

b. Lines and junctions of communication. Throughout this period practically all travel was by water. Hence the settlements were without exception along the waterways, on waters navigable for vessels prior to the expulsion, and on waters navigable by boat or canoe only when it became necessary to seek a refuge from attacks by British vessels. One road of some importance was, however, made in this period, that from the French settlements at Beauséjour to Baie Verte, by means of which great quantities of grain and cattle were exported from the rich marsh lands to Louisburg and Quebec. To facilitate this communication the village of *Baie Verte* was established and to guard it *Fort Gaspereau* was built.

c. Location of good lands. The Acadian people were almost exclusively farmers and hence their settlements were determined more by the quality of the lands than by any other factor. They turned naturally first of all to those wonderfully rich salt marshes at the head of the Bay of Fundy, cleared by nature and needing only to be dyked to be soon ready for the most bountiful harvest. This selection of the marshes by them was the more natural since they were brought from a part of France in which the reclamation of marsh lands was brought to great perfection. Thus were determined the earliest, largest and richest Acadian settlements, those at Annapolis, around Minas Basin, at Beaubassin (Amherst), *Beauséjour* (Fort Cumberland), *Tintamarre* (Four Corners), *Wescak* (Westcock), *Prée des Bourques* (Sackville), *Frée des Richards* (Upper Sackville), *La Coupe* (Jolicœur), *Le Lac* (Ryes Corner), *Memramcook*, *Shepody* and *Petitcodiac*. It was only when the marshes were practically all taken up, or when the Acadians were driven from them at and after the expulsion that they resorted to other lands, which explains why they were so long in settling on the St. John and why they scarcely settled at all at Passamaquoddy and on the North Shore (where marshes exist, but of poor quality), excepting in a few scattered trading and fishing posts. The lands which they took up next after the marshes were the river intervalles, though these, no richer and requiring great labour to clear them of forest, were settled only to a limited extent in this period, and then chiefly after the expulsion. The intervalle settlements made by them on the St. John were on the best intervalles on that river, such as at *Grimross* (Gagetown), *Freneuse* (Maugerville), *St. Annes* (Fredericton), and their later settlements on the *Petitcodiac* (*Babineau*, *Fourche à Crapaud*) were also on intervalles. As to the uplands, apparently no settlement whatever (outside of the fishing and trading posts), were located upon them until after the Acadians were driven from both marshes and intervalles at the time of the expulsion, after which they may have formed upland settlements in retired places, as

at *French Ridge* (near French Lake, Oromocto), and at *Butternut Ridge*. On the repatriation they took up the low uplands around the harbours of the North Shore.

d. Locations of trading centres. Next in importance to the farming settlements came the trading stations which naturally stood in those foci of travel near the centres of the river basins, and, as these contained goods of much value, they were commonly fortified. Such stations existed more or less constantly through this period in all of the geographical foci. At the mouth of the St. John was *Fort La Tour* with other forts later; fortified habitations were established by Nicolas Denys at *Miscou* and *Nepisiguit*, by his son, de Fronsac, at *Miramichi*, by de Chauffours at *Richibucto* and *Jemseg*, by St. Aubin at *Passamaquoddy*, by La Vallière near *Beauséjour*, and a few of minor importance existed elsewhere.

e. Locations of fishing and hunting centres. These were of very minor importance in determining the locations of settlements of this period, for there was little export of fish and the French did not hunt furs for themselves but bought them from the Indians. There were early fishing establishments on *Miscou*, and one form of fishing, that for the sea-cow or walrus, determined certain settlements near their favourite haunts, such as that at *Grande Plaine* on *Miscou*, and very likely it helped to fix the position of *Fronsac* on the *Miramichi*, for Portage Island abounded in them. The French were not themselves hunters, except incidentally, and hence hunting located no settlements.

f. Locations of water powers. The Acadians built mills for grinding their grain, but these were so small that only the smaller brooks, or in some cases the tidal creeks in the marshes, could be utilized. As such powers are everywhere abundant they did not influence the distribution of settlement of this period.

g. Mineral resources. These appear to have had no effect upon the settlements of this period.

h. Positions of great natural charm. Probably in no case was the site of any settlement of this period at all determined by any æsthetic considerations. But the general situation having been determined by the larger factors we have noted it seems clear that the precise positions were often selected with an eye to their beauty of outlook. Thus, at *Chignecto*, *Shepody*, and elsewhere, the sites of Acadian houses occupy the summits of the gravel hills or knolls which afford the most extensive views. Probably the Acadian, who must have shared somewhat in the artistic temperament of his race, was more susceptible to such influences than the more practical and less impressionable New Englander who followed in the next period.

D. Summary.

Such were the factors determining the origin and distribution of settlements in the Acadian period. If now we ask to what extent that distribution affected the locations of settlements to-day, we find that



MAP No. 7.

the present distribution of Acadian settlements was then in a general way determined, but otherwise little influence is manifest.

4. THE ENGLISH PERIOD (1760-1783).

This period of New Brunswick history, although interlocking with the Acadian period from the capture of Fort Beauséjour in 1755, practically began when the fall of Quebec in 1759 gave assurance of the ultimate possession, complete and peaceable, of all Canada and Acadia

by the British. The first new settlers of the period came to the Province in 1761.

The locations of these settlements have been described and mapped, and the historical evidence bearing on the subject has been discussed, in the earlier Monograph on Historic Sites (pages 320 to 336), and such additional facts as have since been discovered will be found in the Addenda to the present series. The principal locations of settlements and land grants are shown in synopsis on the accompanying map (Map No. 7), while the factors determining the distribution there shown are as follows:

A. The Historical Factors.

a. The New England immigration. The expulsion of the Acadians left their valuable lands wholly vacant, and the Nova Scotia Government naturally desired to fill them with good settlers. A few disbanded soldiers from the forts located themselves on lands in the vicinity of Fort Cumberland, and, later, in the present Dorchester and along the Petitecodiac; but to secure an ample influx of desirable immigrants Governor Lawrence and his advisers wisely turned to those best of colonizers, the people of the American Colonies. But the attempt to start an emigration to Nova Scotia met with little success until the fall of Quebec assured British rule for all Acadia, and with it the promise of safety from hostile French and Indians. Then, under the influence of that fever for expansion which always follows the ending of a great war, and stimulated by proclamations of the Nova Scotia Government promising the most liberal conditions as to property, government and religious freedom, a current of emigration began in 1760 from the New England States to Nova Scotia, and continued for ten years or more, sending into that province (then including New Brunswick), several thousands of the best type of Anglo-Saxon pioneers, a race thoroughly habituated to the conditions of life in the new world. Some of these settlers came singly or in small groups in fishing and trading vessels, and thus originated the small settlements of a few families each at *Scodiac* (St. Stephen), *Wilson's Beach* (Campobello), *Indian Island*, *Digdequash*, and elsewhere on Passamaquoddy. In other cases they came as traders, either a company, which originated *Portland*, or singly, originating *Monckton* and perhaps one or two other small places on the St. John. But the most important part of this immigration were the associations, composed of many families from the same neighbourhood, who combined to move, along with their household effects, in vessels hired for the purpose, to large tracts or townships of land specially laid out for and granted to them. In this way associations from Rhode

Island settled *Sackville*, including *Westcock*, *Upper Sackville* and *Four Corners*, and *Cumberland* (now *Westmorland*), including *Jolicœur*, *Point de Bute* and *Baie Verte*, while an association from Essex County, Massachusetts, settled *Maugerville*. It is noteworthy that all settlements founded in this way have persisted and grown to the present day.

b. *Immigration from Great Britain*. In the meantime, but manifesting itself somewhat more slowly, under the inspiration of similar motives, supplemented by bad economic conditions at home, a similar emigration began from Great Britain which sent into Nova Scotia a few thousands of English and (especially) of Scotch settlers, of which a few hundreds settled in the present New Brunswick. Most important of all of these immigrants were the Yorkshiremen, who, encouraged by inducements similar to those held out to the New England settlers, came in groups to Nova Scotia in 1772-1774, and settled to the number of some forty families or more in *Cumberland* (*Westmorland*), and *Sackville*, where they bought farms from the earlier grantees, while a few of them later settled in the present *Dorchester*. A few immigrants from other parts of England settled on the St. John at *Gagetown* and other scattered points. Another important feature of this immigration was the first settlement of *Miramichi* and *Restigouche* by Scotch. In 1764 William Davidson, from the north of Scotland, settled at Wilson's Point, obtained a large grant and started a salmon fishery, in which he was soon joined by others of his fellow countrymen. A little later, about 1775, began the movement of the Scotch from St. John's (Prince Edward) Island, to the *Miramichi*, which continued through the period until at its close some thirty or more families, mostly Scotch, were scattered along the river below Wilson's Point. St. John's Island had been granted to a few proprietors who brought out numerous Scotch settlers to people their lands as tenants, but these, finding the conditions there intolerable, removed to *Miramichi* and *Restigouche*, especially in the early part of the next period. The settlement of *Restigouche* began about 1775, when Shoolbred and Smith, two English traders, established a salmon fishery at the head of tide and brought out eight skilled Aberdeen fishermen, who settled at and above the present *Campbellton*, and some of whom remained to found the settlement of that river. Trading posts were established at *Nepisiguit* (*Alston Point*) and *Walkers Brook* by the English Commodore Walker, but were soon (in 1776) destroyed by American privateers, though some of his employees appear to have lingered at *Nepisiguit* as fishermen until the close of the period. All of the immigrants of this period, although unaccustomed to new world conditions, soon adapted themselves to their surroundings, and, being industrious, moral, and loyal, became a most

valuable element in the population of the province, where their settlements have persisted and grown to this day.

c. *Attempt to settle Nova Scotia on the tenant system.* During this period, and especially in the years from 1765 to 1770, the Government endeavoured to promote the settlement of the country by making great grants of land to proprietors and land companies, who agreed to settle these estates with tenants or other settlers. In this way a large part of the best and most accessible lands in New Brunswick (shown on the accompanying Map No. 7, but excepting Maugerville, Sackville and Cumberland) were granted, not to actual settlers, but to promoters of settlement. In a few cases settlements were formed under this system. Thus Captain Owen settled some thirty-eight settlers on his grant of *Campobello*, Captain Spry placed a few settlers on his lands at *Spryhampton*, on the St. John (though they did not remain), as did Charles Morris in *Morrisania* and Arthur Goold in *Gooldsborough*, though in some of these cases the settlers came of their own accord to the St. John, and bought or squatted on lands belonging to the proprietors. The land companies having the grants of *Hillsborough*, *Monckton* and *Hopewell* brought a few Pennsylvania German settlers to these lands, and the grantees of that part of Hopewell south of Shepody (now in *Harvey*) also placed a few settlers on these lands, as did those having the grant of a part of the present *Dorchester*, though in this latter case the settlers may have been squatters. In a few other cases, though there was little actual settlement, enough attempt was made to settle the grants to enable them to be held and sold in the next period, as in the case of *Kembles Manor*, *Glasiens Manor* and some smaller grants on the St. John. The settlements thus formed, however, were always small, and in nearly all cases characterized by quarrels between tenants and proprietors, which culminated in the case of the Monckton, and apparently the Hillsborough and Hopewell, settlers, in suits at law against the proprietors whereby the tenants obtained possession of their lands. Thus, not only did this system of great grants not accomplish what was expected of it, but it actually impeded settlement in the next period, for, although in time these lands were regranted to actual settlers, it was only after the earlier grants had been legally escheated, a process requiring much trouble and delay at a period when the lands were imperatively needed for new settlers.

d. *Repatriation of the Acadians.* The Treaty of Paris, of 1763, which finally transferred all Canada and Acadia to England, changed entirely the status of the Acadian people. On the one hand, by transferring to England their former French refugees in Quebec, Isle St. John and Cape Breton (leaving St. Pierre and Miquelon alone under

the rule of the French), it rendered inevitable their ultimate acceptance of British allegiance; and on the other, by making their presence in Acadia no longer a menace to British rule, it made them no longer dangerous, and even ultimately welcome, settlers. It was not immediately, however, that the situation was understood by either the Nova Scotian Government or by the Acadians, for it was not until after 1764 that the Government realized that the Acadians could no longer be a menace to the province, and not until 1767 that the Acadians showed a willingness to adapt themselves to the new conditions and settle down as British subjects. In 1767 and 1768, however, they began to submit themselves to the inevitable, took the oath of allegiance as British subjects, and were encouraged to take up lands in various parts of the province, of which grants were later given them. Thus originated the Acadian settlements now existing at *Memramcook*, *Fox Creek* and *Belliveau* on the *Petitcodiac*, *French Village* and *Upper French Village* in Kingsclear on the St. John (with other Acadian settlements on that river now extinct), *Shediac*, *Cocagne*, *Bay du Vin*, *Burnt Church*, *Neguac*, *Miscou*, *Caraquet* and *Nepisiquit*, with perhaps a few others at scattered points. The Acadians in refuge in Cape Breton, Isle St. John and Quebec mostly settled in those places, but many preferred to return to their beloved Acadia, and settled in various places upon the North Shore, while large numbers returned from St. Pierre and Miquelon, also mostly to the North Shore. This movement continued, as we shall see, into the next period, originating the principal Acadian settlements in that region. Thus were the Acadians repatriated in Nova Scotia, including our present New Brunswick.¹

e. The Revolution and privateering. The long series of misunderstandings between Great Britain and her colonies led at length to war, and in 1776 the Revolution began. It had four important consequences for the settlements of New Brunswick in this period. (1) It stopped all immigration both from the American Colonies and from Great Britain. (2) It produced local disturbances between the New England settlers, who naturally sympathized with the revolted colonies, and those from Great Britain who remained loyal, and whose loyalty, by the way, was a great factor in holding Nova Scotia for Great Britain. These disturbances resulted in the return of many New Englanders, especially from

¹ In 1763 one Jacques Robins petitioned for land at Miramichi, and permission to gather the Acadians into a settlement there, but this was refused. (Murdoch, Nova Scotia, II, 436; Archives, 1894, 241). I presume this was one of the firm of Robin and Co., the Jersey fishermen, who afterwards established their principal station at Paspébiac, with a branch at Caraquette (Perley, Report on Sea and River Fisheries of New Brunswick, 42). Doubtless his object was to establish such a station at Miramichi.

about Sackville, to their former homes in the new States, and hence to some loss of the New England population.¹ (3) It permitted a system of privateering, through which the exposed settlements (especially those of English and Scotch origin) were greatly hampered and retarded in their growth, as at *Hillsborough* and elsewhere on the Petitcodiac, at *Miramichi*, and at various places in the present Nova Scotia (notably Yarmouth and Cornwallis), or had to be temporarily abandoned entirely as at *Nepisiquit* and *Restigouche*. On the other hand it led to a movement of settlers from exposed places to, and a marked increase in the settlements on the St. John, which was protected from attack partly by its peculiar situation above the "falls" on a retired river, and partly by the forts Frederick and Howe at the mouth of the river. Many settlers came from Yarmouth and Cornwallis in the present Nova Scotia, and a few from Passamaquoddy to the St. John at this time, and settled in or near the settlements already established on that river. The Passamaquoddy settlements were less disturbed than the others, no doubt because occupied almost entirely by the New Englanders with whom the privateers had some sympathy. (4) It made necessary the defence of the St. John, especially from privateers, and hence re-occupation of Fort Frederick at the mouth of the St. John, and the building of a new fort, *Fort Howe* (in 1778), while the disturbed conditions made it seem needful to erect a block house fort (*Fort Hughes*) at the mouth of the Oromocto, which both served as a defence against possible Indian risings, and to protect the river against a possible invasion by way of the old Oromocto-Magaguadavic Indian portage route.

f. Relations with preceding settlers. The immigrants of this period found in New Brunswick scattered bands of Acadians and of Indians, sullenly submissive to British rule. Such hostility as there was from the Indians was sporadic and local, and hardly checked the settlements of the period. The only case of such influence occurs possibly in the location of *Maugerville*, which, according to tradition, was to have been located at St. Annes (Fredericton), had not the Indians forbidden the occupancy of that site. The Acadians showed no active hostility, nor had the new settlers any serious fear of them. Hence the settlements of this period were extended practically without regard to the presence of either Indians or Acadians.

¹ This subject is treated, with the names of heads of families which thus returned to the United States, in "Memoir of Col. Jonathan Eddy," by Joseph W. Porter, Augusta, 1877.

B. Sociological Factors.

a. Government. Both the New England and the English immigrants were accustomed to representative government with a legislative capital. This had been fixed for all Nova Scotia, including New Brunswick, at Halifax in 1749, and hence the question of a capital did not affect settlement in New Brunswick in this period.

b. Occupations. Nearly all the immigrants of the period were farmers and hence their settlements were determined chiefly by the distribution of the best accessible lands, as a comparison of the soil map (Map No. 4) with the accompanying Map No. 7 will show. A few were traders in furs, in fish, which now became an article of export, and in lumber, of which, however, but a single kind, namely, pine trees for masts for the royal navy, was exported. There was a limited trade in lime and in a very few minor commodities. Thus a few trading settlements, at the favourable geographical centres, became of importance in this period.

c. Racial character. The New Englanders were dominated by the pioneering spirit; they were bold, enterprising, adaptable, and extended far into the wilderness or upon solitary islands with no fear and with little loneliness. They had little attachment to the soil and moved without hesitation to more promising localities. These characteristics, combined with their occupation, acted dispersively upon their settlements, making them small and scattered rather than compact and centralized. The English and Scotch immigrants, on the other hand, manifested, and naturally, less tendency to spread, and preferred to settle in villages or compact settlements as had been their custom at home.

d. Religion. All of the immigrants of this period were Protestants, and hence, unlike their new fellow countrymen, the Acadians, were not influenced in their practical affairs by any church organization. Like men of the same race to-day, a desire for material profit was their leading impulse, and their religion did not interfere appreciably therewith. They extended their settlements where profit or pleasure led them and subsequently organized churches in their new homes. Hence, religious conditions produced no traceable effects upon the distribution of their settlements.

C. Environmental Factors.

a. Accessibility. The peculiar geographical relation of New Brunswick to Nova Scotia, whereby the southern coast of the province is of easy access from New England while the north coast is remote and hence difficult of access, greatly influenced the settlement of this period. It is for this reason chiefly that all of the New England settlements

were without exception upon the Bay of Fundy waters. On the other hand the north shore being as accessible as the southern, (or rather more accessible) from Europe, it results that the settlements of English and Scotch origin were either in the Bay of Fundy (the Yorkshiremen), or upon the North Shore, and with a marked preponderance, when all three provinces are taken together, in favour of the latter. This marked difference was not limited to this period but has continued, though in lesser degree, to the present, so that as a whole the Bay of Fundy slope of the province has received its population largely from the present American States, while the North Shore has been chiefly peopled from Europe.

This same geographical factor also markedly influenced the distribution of the Acadian population after the repatriation, for it led the Acadians returning from Quebec, from Isle St. John, and from St. Pierre and Miquelon to settle along the North Shore rather than to join their fellow countrymen around the Bay of Fundy. Another phase of accessibility is found too in the fact that those settlements south of the Miramichi were mostly founded, or at least enlarged, by Acadians from Isle St. John and from St. Pierre and Miquelon while those north of the Miramichi were settled by Acadians, together with some Canadians, from Quebec, including Gaspé.

b. Lines and junctions of communication. In this period all communication was still by water, and the new settlements were formed in all cases upon waters navigable by vessels as a comparison of our Maps Nos. 3 and 7 will show. It happens that the best lands of the province, salt marshes, and intervalles, are upon such waters, so that these two potent factors co-operated to locate the settlements as they were.

c. Location of good lands. The great majority of the immigrants of the period, and all of the Acadians, were farmers, and hence sought the good lands. At the opening of the period the best lands of the Province, the great salt marshes at the head of the Bay of Fundy, lay vacant, and in large part prepared for culture by the previous labours of the Acadians. To these lands the New Englanders naturally turned first, and there they founded the earliest, largest and most prosperous settlements, including *Sackville*, *Cumberland* (now *Westmorland*), and later, *Dorchester*, *Hopewell*, *Hillsborough*, and *Moncton*; and it was these lands which attracted the second most important immigration of the period—the Yorkshiremen. The marsh lands however, were more extensive than the new settlers were numerous, and considerable tracts of good marsh in less desirable situations, on the Memramcook and Petitecodiac

were left unoccupied by them, and were later taken up by their former Acadian residents, through which circumstance alone does it come about that any Acadians live to-day on Bay of Fundy waters. Next after the marshes the new settlers took up the intervale lands along the St. John, also in some measure prepared for them by the Acadians, and thus were founded *Maugerville* and minor settlements along the river. None of the new non-Acadian settlements in this period, excepting in the case of trading or fishing settlements, were located on the uplands. Those Acadians who settled on the St. John, Petitcodiac and Memramcook also occupied marshes or intervales, but those of the North Shore were obliged to clear the uplands, which, fortunately, in the vicinity of the harbours are of fair quality and well drained. So uniform are these conditions along the North Shore that, except for a few areas of bog lands, the Acadians were able to find fair soil wherever they desired, for other reasons, to settle.

d. Influence of earlier settlers. In only a minor way were the settlements of this period influenced by the location of those of the preceding period, and the remarkable coincidence in location of the settlements of the Acadian and English periods (so clearly shown by the comparison of Maps Nos. 6 and 7) is chiefly due to like response to similar environmental influences. Minor effects may occasionally be traced, as in the case of *Maugerville*, whose exact site was probably fixed in part by the already cleared lands of the old Seigniorie of *Freneuse*, or of *Gagetown* on the extensive lands of *Grimross* cleared by the Acadians. Very likely, too, the lands best diked by the Acadians were the first of the dike-lands taken up by the New Englanders, for although the dikes had been broken down, they were by no means entirely destroyed. Indeed, it is very probable that, had it not been for the previous work of the Acadians in dike-building, and especially for the instruction given by them in the management of diked lands, the new settlers would not have occupied them, and would only slowly have learned their value and management.

c. Location of fishing grounds. Some of the new settlers were fishermen and a considerable export trade in fish grew up in this period. The most important fish for this trade was the salmon, which was cured and exported in barrels. The best places for the salmon fishery on a large scale are near the head of tide on the rivers. It was this fishery which helped to locate the settlements of this period at *Scoodie*, at *Miramichi* (Wilson's Point), at *Nepisquit*, and especially at *Restigouche*, the two former by New Englanders and the three latter by various persons from Great Britain. The salt-water fishery was less important, but was of sufficient value to attract to the rich fishing

grounds of Passamaquoddy a number of New England fishermen, who settled upon the various islands. The sea-cow (walrus) fishery ceased to exist early in this period, and the small amount of whale, porpoise and other fishing did not appreciably affect settlement.

f. Location of trading centres. In this period trade became of increasing importance, with the chief exports, furs,¹ lime and pine masts, and of course these stations grew up in the geographical foci of the Province. There was one at *Indian Island* for Passamaquoddy, at *Portland*, with others at *Monckton* and *St. Annes*, for the St. John, at *Wilsons Point* for the Miramichi, at *Alston Point* for the Nepisiguit, and at *Walkers Brook* for the Restigouche. In the Chignecto region no single trading station of importance seems to have arisen.

g. Outlets for the lumber trade. The only lumber export of this period consisted of white pine cut for masts for the royal navy. This tree occurred in New Brunswick in great perfection upon two rivers in particular, the St. John and the Miramichi, of which at this time the former was the more important because of the greater abundance of labour there available. *Portland* was the natural port of shipment for it, and this trade co-operated with other trading interests to build up that place.

h. Location of water powers. The agricultural settlers of this period needed mills to grind their grain and to saw lumber for local use, but, owing to their limited numbers and small resources, they were able to use only those of minor importance, such as occur at the falls of brooks rather than of rivers. So abundant are such brook falls throughout the Province that they could be found almost everywhere they were needed, and hence they hardly affected the location of settlements. Many of the streams in the Province, known as *Millstream* or *Mill Brook*, received their names in this way in this period. Of the somewhat larger powers utilized at this time the most important were *Denys Stream* near the present St. Stephen, and the *Nashwaak* at the present Marysville.

i. Location of mineral resources. The occurrence and distribution of minerals in the Province appears not to have influenced the distribution of settlements in this period. A partial exception occurs in the case of *Portland*, where the limestone above the falls was early

¹ The extent of the fur trade in this period is shown by figures given by Dr. Raymond in his "St. John River" (Ch. XVII). He shows that the firm of Simonds and White exported from St. John in the ten years preceding the Revolution, skins of at least 40,000 beaver, 11,022 musquash, 6,050 marten, 870 otter, 258 fisher, 522 mink, 120 fox, 140 sable, 74 racoon, 67 loupcevier, 8 wolverine, 5 bear, 2 Nova Scotia wolf, 50 caribou, 85 deer, and 1,113 moose. Of course many others were exported from the other stations also.

quarried and burnt, making the export of lime to New England a factor in the trade of that place.

j. Positions of natural charm. This period was a severely practical one in New Brunswick, and aesthetic considerations had no place in the location of the settlements. Happily, however, the best and most accessible lands of the Province happened to occur in places possessing the greatest natural beauty, so that the settlers of this period were fortunate in their natural surroundings. No doubt, in very minor matters, as in the selection of the precise positions for houses, etc., considerations for beauty of outlook were given weight.

D. Summary.

These factors together amply explain the distribution and character of the settlements of this period. If now we ask what effect the distribution of these settlements had upon those of the present, we find that it was most important; for in this period were founded a considerable number of those important settlements of to-day whose location is determined by natural factors, and which stand in the more accessible and richer parts of the Province.

5. THE LOYALIST AND NATIVE EXPANSION PERIOD (1783-1812).

This period began with the advent of the Loyalists in 1783, continued through some thirty years of growth, chiefly from internal expansion of the New England, Acadian and Loyalist settlements, and closed about the time of the war of 1812, which marks the approximate boundary between the period of native expansion and that of active European immigration. The locations of the Loyalist settlements, and of the great grants on which they have been formed, are described and mapped in the earlier Monograph on Historic Sites, 336-345, and the principal facts as to the Loyalist and other settlements of the period are shown on the accompanying Maps, Nos. 8 and 9.

A. Historical Factors.

a. Advent of the Loyalists. The expansion of the British race in the marvellously rich, spacious, and energy-stimulating country of America gave it a people of wonderful growth, not only in numbers and wealth, but in character, individuality and capacity for independent thought and action. Under such circumstances the independence of this people from the control of the mother country could be only a question of time. It was hastened, however, by misunderstandings,

slight at first and easily adjusted had the rulers of England been wise. But this they were not, and the first differences, widened by arrogance and ignorance on one side, and by impetuous local pride on the other, ultimately arrayed America against her mother country, England. When, however, events pointed towards war, it was by no means a United America which faced England. On the contrary, Americans



MAP No. 8.

were nearly equally divided, one party counselling moderation and patience for the sake of the integrity of the Empire, while the other impetuously declared for war and separation. The radical party prevailed, declared the independence of the colonies, and began the war of the Revolution. The party of rebellion showed a wonderful courage, for they had to face not only the mighty power of England, but the opposition, and later the armed resistance of their own Loyalist fellow-countrymen. In the war which followed the English displayed a

military incapacity never before or since exhibited in their history, an incapacity, however, quite in harmony with the quality of the statesmanship which brought on this needless war. The Americans, wonderful to say, won; and by the magic of their success transmuted the crime of rebellion into the honourable institution of independence. During the progress of the war large numbers of the Loyalists ceased to use argument alone against their fellow-countrymen, and took up arms on behalf of England. Thereby they incurred from the struggling Americans a hatred more intense than that against England herself. Thus it came about that on the declaration of peace¹ the Loyalists, soldiers and civilians alike, who had been collected into the British garrisoned towns, could not, because of the persecution of their erstwhile neighbours, return to their former homes, but were forced into exile. Naturally they turned for refuge and new homes to the nearest of the remaining possessions of England, and in 1783 they went by thousands to the British West Indies and into British America, especially into Nova Scotia (including New Brunswick), to which they came to the number of some twenty-eight thousand. To these countries they were a most welcome accession; and, coming with all the value of their native worth, with the prestige of their loyalty, and with the gratitude of the mother country, they naturally were accorded the best in lands and other emoluments that those countries afforded.

When the Revolution closed, the Loyalists who came to Nova Scotia were collected almost entirely in two centres, New York City, and Castine, Maine, and from these places they removed in the summer and autumn of 1783 (and possibly from Castine in the spring of 1784), those from New York mostly settling on the St. John, and those from Castine at Passamaquoddy. They included both the Loyalist regiments and large numbers of civilians, all of course with their families, and the civilians were in some cases organized into associations containing those from a given state or other locality. In Nova Scotia (including then the present New Brunswick) the best available lands were laid out for them in large blocks, and on their arrival, the regiments, now disbanded, or the associations were assigned each to a particular block,² while other blocks were assigned to mingled soldiers and civilians from various sources. The city of St. John and the town of Carleton were laid out in small city lots and granted to Loyalists, mostly civilians, and especially those not assigned to the special blocks. With the Loyal-

¹The movement to Halifax at the evacuation of Boston in 1776 seems not to have affected settlement in New Brunswick, though no doubt individuals from that source ultimately settled in New Brunswick.

²These blocks are located and named on the map No. 46 in my "Historic Sites."

ists came some other groups of new settlers not properly Loyalists. These included at least two disbanded Scottish regiments (the 74th Highlanders settled on the Digdeguash and St. Croix, and the 42nd Highlanders on the Upper Nashwaak). Of a different kind was the Cape Ann Association, which was settled in *St. David*, Charlotte; these settlers were not Loyalists, but apparently came as immigrants to take advantage of the supposed opportunities offered in this new and growing province, and it is probably because they were not Loyalists that these settlers had to be content with lands back from navigable waters, the only example of a settlement in this period so placed.

The original Loyalist settlements of New Brunswick, namely those formed by the Loyalists immediately after their arrival on lands for the most part especially assigned them for this purpose are approximately shown on the accompanying map (Map No. 8), and were as follows: The Passamaquoddy settlements occupied most of the Parish of *St. Stephen*, including the town of *St. Stephen*, *Old Ridge*, *Milltown*, and *Upper Mills*; the present *Dufferin*; the shores of *Oak Bay*; *Tower Hill* and *Lever Settlement*, with other upland settlements in *St. David*,¹ the river shore of the present *St. Croix* Parish; all of *St. Andrews* Parish, including the town of *St. Andrews*; the coast of *Bocabec* and *Digdeguash* and the settlement on that river above its mouth, in *St. Patrick*; the *Magaguadavic* River to Second Falls, with *Letite*, the former town of *St. Georges* at Letang, and some of the islands in *St. George*; a few islands in *West Isles*; *Beaver Harbour*, with the former town of *Belleview*, *Black's Harbour* and *Seelye's Cove* in *Pennfield*; *Lepreau Village* and vicinity at *Lepreau*; and *Grand Manan* in the vicinity of Grand Harbour. Along the coast towards St. John, *Dipper Harbour*, *Moose Harbour*, *Harbour by Chance*, *Musquash* and *Pisarinco* were also settled by Loyalists. Beyond the St. John, in the present *Simonds*, settlements formed on Little River, at *Red Head*, *Mispec*, apparently at *Gardner's Creek*, *Emerson's Creek*, *Tynemouth Creek*; and at *Quaco* in *St. Martins*. Along the St. John the Loyalist settlements extended from its mouth to above Woodstock, and to the heads of the navigable branches, excepting only, of course, the sites of the earlier settlements of the English period. They included the *City of St. John* and the *Town of Carleton*, with the river settlements of *Lancaster*; the river settlements of *Westfield*; the Kennebecasis and (to some extent) Hammond River settlements in *Rothsayer*, *Hampton*, *Kingston*, *Norton*, *Sussex*, with *Sussex Village*, and *Studholm*; the Long Reach settlements in *Greenwich* and *Kingston*, the Bellisle settlements in *Kingston*, *Springfield* and *Kars*; the river settle-

¹ The St. David settlements are here reckoned, like the 74th and 42nd Regiments, among the Loyalists simply for convenience: note the preceding paragraph.

ments in *Hampstead*, *Wickham*, *Gagetown*, including *Gagetown Village*, and *Canning*; the Washademoak Lake settlements in *Cambridge*, *Wickham* and *Johnston*; the Grand Lake settlements in *Canning*, and *Waterborough*; the Little River settlements in *Sheffeld*; the river settlements in *Burton*, including *Oromocto Village*, in part of *Lincoln*, *Upper Ruisagonis*, and up the *Oromocto* to the Forks; the river settlements of *Fredericton*, including *Fredericton City*, in *St. Mary's*, with the *Nashwaak* settlements to Cross Creek; the river settlements in *Douglas*, *Bright*, and on the lower *Keswick*; the river settlements in *Kingsclear*, *Prince William*, *Queensbury*, part of *Dumfries*, *Canterbury*, *Southampton*, *Woodstock* and *Northampton*. Outside of *Passamaquoddy* and the *St. John* no lands were laid out especially for Loyalists, though later, as will be noticed under the next section, many of them individually received grants in various other parts of the province. Many families chose to settle in the older settlements in *Portland*, *Maugerville*, *Sackville* (including *Westcock*), *Westmorland*, and on the lower *Memramcook*, in the present *Dorchester*, and in these places they either purchased lands or ultimately secured grants either of lots abandoned by older grantees or of new lands. Those who settled in *Kemble's Manor*, *Portland*, and in some of the large blocks of land granted along the *St. John* in the preceding period and not forfeited by the proprietors, had, of course, to purchase their lands from the grantees.

With the Loyalists came many negroes, former servants of masters no longer able to maintain them, and efforts were made to settle these negroes in settlements of their own. Three blocks were laid out for them on the back lands on each side of the *Nerepis* grants, and near the lower end of *Kingston Peninsula*, and some beginnings of settlements were made, but they were soon abandoned and most of the negroes returned to live in the towns, with the exception, apparently of a group who settled, about 1812, at *Otnabog*, founding the present flourishing negro settlement of that place. The negro settlement at *Willow Grove* is of later origin as will be described below.

b. *Foundation of the Province of New Brunswick.* In 1621 the Province of *Nova Scotia* was established, including all of the peninsula of that name, with *New Brunswick* and *Quebec* north of it to the *St. Lawrence*. It retained these limits through all changes down to 1763, when the *St. Lawrence* slope was added to *Quebec*. The Loyalists, therefore, found upon their arrival the Province of *Nova Scotia* undivided, with the capital at *Halifax*. Owing to the great distance of that capital from the new centre of Loyalist population in *New Brunswick*, and owing also to governmental inefficiency there, the intentions of the British Government to settle the Loyalists rapidly on the best vacant

lands were executed so badly, north of the Bay of Fundy at least, that much distress and discontent ensued. A knowledge of this, and a desire to provide employment for many worthy Loyalists already well versed in government, led the British Government in 1784 to erect all that part of Nova Scotia north of the Bay of Fundy, within which some 12,000 or more of the Loyalists were settled, into a separate province called New Brunswick. For the new province a capital was needed, which, temporarily placed at St. John, was a year later, in 1785, located at Fredericton, which was founded for this purpose.

c. Loyalist readjustment. A large proportion of the Loyalists who came to New Brunswick served as soldiers in the Loyalist regiments during several years of the Revolution. But the life of a soldier is a poor preparation for the occupation of pioneer farmer, and they made restless settlers, which fact, combined with the unfortunate delay in assigning lands and with the restless spirit natural to the times, made the earlier Loyalist settlements somewhat unstable. There was much abandoning of grants (with later escheats and re-grants), resettlement in other localities, and moving in search of better lands, opportunities for trade, etc., as well as a good deal of return to the United States. This spirit existed for some years, and produced a readjustment of the original Loyalist settlements in various directions. Thus, many families, selling or abandoning their grants, settled among the older settlers at *Deer Island*, at *Campobello*, and on the St. John, in these cases, of course, purchasing their lands. The settlers at Beaver Harbour left that place in a few years, and settled in part of *Pennfield Ridge*. In other cases certain enterprising Loyalists transferred themselves from Passamaquoddy and the St. John to places of advantage elsewhere in the Province, notably to *New Canaan* on the Washademoak, to *Moncton*, to *Hopewell*, to the present *Dorchester*, to *Baie Verte*, to *Richibucto*, to *Restigouche*, to *Tracadie*, to *Shippagan*, to *Nepisiquit*, and singly or in small groups no doubt to other places on the North Shore also, while some of them possibly reached the branches of the Upper St. John, especially the *Becaguimec* and *Tobique*. The Loyalists of Bay Chaleur probably came by way of Quebec, and not from the St. John. In all of these places they either purchased lands from earlier settlers, or else, and most frequently, inaugurated their modern settlement, and later obtained grants of lands. But the most important of the Loyalist readjustment settlements were in the valley of the *Miramichi*, to which considerable numbers (probably fifty families or more) of Loyalists removed from the St. John and Nashwaak in 1785 to 1787, including also some of the Nashwaak settlers of the 42nd regiment, who aban-



doned their land there and settled in the present *Nelson* and *Derby*. These Loyalist settlers either located themselves among the older residents in the present *Newcastle* and *Chatham*, or else formed new settlements along the lower parts of both branches of the *Miramichi* in *Derby*, *Nelson*, *Blackville*, *Northesk* and *Southesk*, and they also settled *Bay du Vin*.

d. Resumption of European immigration. During the Revolution, immigration from Great Britain to the present New Brunswick ceased, but after 1783 it began again, slowly and sporadically at first, but later more actively. This was encouraged by the Legislature of New Brunswick. Thus in 1793, a select committee was appointed to draw up and report to the House "some plan proper to be adopted for introducing settlers into the province," and in 1802 eleven emigration commissioners were appointed by the House. I have not been able to trace the results of these two movements. The new settlers who came to the Province whether singly or in small groups appear for the most part to have settled in or near the older settlements, or in the towns, especially in the city of St. John. Thus, the Journals of the House of Assembly for 1805 mention that the commissioners for encouraging settlers paid £164 for the passage of seven families (40 individuals) who had settled at Sussex Vale and St. John. An important early immigration into the Province was that to the Restigouche valley, to which there came in 1783 and the following years a few settlers from Scotland, who settled at *Athol Point* and thereabouts, and were gradually joined by others both from Scotland and from Prince Edward Island. A more considerable immigration of Scotch, in part directly from Scotland and in part from Prince Edward Island, came in this period to the *Miramichi*. In part the new settlers distributed themselves among the older settlers along the lower river, but about 1801 a few families from Ayrshire settled on the Main South West *Miramichi*, founding *Doaktown* and the settlements above and below it, while Major McDonald and a few soldiers of the disbanded 78th Regiment settled at *Black River* near Bay du Vin about 1790. Some time prior to 1812 a group of Scotch Roman Catholics had settled on the *Bartibog*, but these came probably not directly, but from Prince Edward Island. It is probable that some Scotch came during this period also to the *Richibucto* and perhaps to other scattered points. One reason for this immigration of Scotch to the North Shore at this time was the convenience of passage in the vessels going out to these rivers for timber, which was now being exported in some quantity.

Another important early immigration was that of the English settlers at *Shediac*, of whom the first, in 1785, was a London merchant,

William Hanington, who purchased an earlier grant, including all of the west side of Shediac Harbour. He was joined later by settlers from various sources, whose descendants still occupy those lands and neighbouring parts of the province. Another immigration added to *Nepisiquit* its first permanent English-speaking settlers,—James Sutherland, an Englishman, with a few others, who came by way of the United States in 1789. The only case of a compact immigrant settlement formed in this period is that of *Scotch Ridge*, near St. Stephen, formed by a disbanded Scottish Regiment in 1804, a thriving settlement which soon expanded to *Pomeroy Ridge* and *Basswood Ridge*. Another form of immigration which here may be mentioned is that from the United States, the only notable example of which, in this period, is *Grand Manan*, to which numerous American settlers came prior to 1800, though others no doubt settled singly in other parts of the Province. Yet another form brought into the province certain disbanded soldiers from Quebec, one of whom founded the settlement at *Jacquet River*.

e. Expansion of the Loyalists. Once adjusted to their surroundings, the Loyalists prospered and multiplied in numbers. As the young men came to maturity, they desired and sought new farms for themselves, for which they readily obtained grants, thus originating a period of expansion of the original Loyalist settlements. The first phase of this expansion was the taking up of the unoccupied lots abandoned by the first grantees in the original settlements, thus producing at first rather a consolidation of the older settlements than the formation of new ones. Another, though rather later, phase of combined expansion and consolidation was the settling of various military reserves set apart among the first settlements, but apparently soon thrown open to settlement.¹ In a few years, however, this consolidation had been practically completed, and a movement into the wilderness lands began. First of all, this movement led to the settlement of the second tier of lots in the rear of the older settlements wherever good lands existed. In this way a fringe, as it were, of new settlements was made on the uplands back of the older settlements, which seems to have occurred, to a greater or less extent, in all of the original Loyalist parishes. In most cases, however, these new settlements were considered simply as parts of the older, and do not bear separate names. Their positions are

¹ I have not found the date of the opening of these military reserves, of which there were several along the St. Croix. Apparently the timber reserves were not thrown open for settlement until 1825. In 1790 certain restrictions on the granting of lands were made by the British Government, apparently in "additional instructions" to Governor Carleton, but these were soon after removed. It is to be remembered that the control of the Crown Lands was not transferred to the Province until 1837.

often indicated by roads sometimes parallel with and sometimes at right angles to those of the older settlements. In some cases the new settlements were a considerable distance back from the older, in which case they often bear distinct names. The more important settlements of this character were *New Ridge* and some minor settlement in St. David's, *Pleasant Ridge*, *Midland*, *Case Settlement*, *Butternut Ridge*,



MAP No. 9.

Geary (apparently one of the oldest upland settlements in the St. John Basin), *New Maryland*. But in many cases the back lands along the older settlements are of inferior quality, and then the new settlers moved either to new harbours or islands along the coast, or, more commonly, to new lands above the old settlements on the principal rivers. Of the new coast settlements the most important were those at *Macos Bay* and the various small harbours westward to *Letite*, together with most of the small islands in *West Isles*; of this character, too, were no

doubt some of the settlements in the coves and creeks east of St. John. The expansion settlements on the rivers above the old settlements were, however, of most importance, constituting some of the most important in the province. Some small advance seems to have taken place up the St. Croix, Digdeguash and Magaguadavic, but it reached its greatest importance on the branches of the St. John. Of this character are the settlements on the upper Nerepis in *Petersville*, upper Hammond river, originating the parish of *Upham*; the north side of *Loch Lomond*, those on Studholm's Millstream, including *Millstream*, *Berwick*, *Mount Middleton*, *Head of Millstream* and *Snider Mountain*; those on Trout Creek with *Waterford* and *Dutch Valley*; those on Smith's Creek with *Newton*; on Salmon (Kennebecasis) river to the portage; along Belleisle Creek to its head with upland branches to *Bull Moose Hill* and *Case Settlement*, and beyond to *Collina* and *Kierstead Mountain*; on the Washdemoak, including *Long's Creek* and the settlements above the rapids towards New Canaan; on the Lower Salmon river and *Newcastle Creek* to the mines; on the Oromocto, for several miles on both branches, originating the settlements of *Blissville* and *Gladstone*.

Most important of all, however, of the Loyalist expansion settlements were those formed along the upper St. John in the present Carleton County from Woodstock to Presquile and somewhat above. As early as 1790 a considerable movement began from the Loyalist and New England settlements of the lower St. John to the part of that river above Woodstock, and this steadily increased until, in 1810, it had established a line of settlement all along the St. John to the present *Wakefield*, *Brighton*, *Simonds* and *Peel*, with scattered settlements beyond in *Wicklow* and *Kent*, and had even, at *Jacksontown*, commenced to settle the back lands. In the next period this same movement continued until it had peopled all the uplands of Carleton, especially west of the river, with a nearly pure native population, descendants of New Englanders and Loyalists. Similarly the Loyalist readjustment settlement of the lower Miramichi, in combination with the earlier Scotch settlers there and with the new immigrants, expanded somewhat up the different branches of that river, reaching the Sevogle and even to Portage river on the northwest; while, in combination with some later immigrants, an expansion of the 42nd settlement on the Nashwaak, settling in Ludlow, extended up the Main Southwest to the Taxis, and as well up the lower courses of some of the principal branches, notably the Barnaby. Similarly, the combined Loyalist and Scotch, in this case especially the latter, expanded along the north side of Miramichi Bay to *Burnt Church*, *Tabusintac*, and

beyond even to Shippegan and Miscou, to *Bay du Vin* and (before 1808) to *Kouchibouguac*.

f. Expansion of the settlements of the English period. In the meantime the earlier or pre-loyalist (English Period) settlements were growing vigorously and expanding rapidly. In the Passamaquoddy and St. John districts the older settlers and the Loyalists mingled as one people and expanded together. Thus the New Englanders of Maugerville went with the Loyalists up the St. John to Carleton County. The descendants of the settlers of Sackville expanded to *Point Midjie*, and, with those of Westmorland, extended beyond Baie Verte and along the coast thence to *Cape Tormentine* and *Cape Jourimain* (before 1810), and even in some numbers to *Shediac* (Map No. 9) and beyond. In conjunction with others from Cumberland County, Nova Scotia, they helped to settle *Buctouche*, possibly *Cocagne*, probably *Richibucto* and *Kouchibouguac*, with *Hardwicke* and *Escuminac* near Bay du Vin. In another direction they expanded to *Dorchester* and to *Hopewell*, and, mingling with the new settlers from Hillsborough and Moncton, extended up the Petitcodiac to *Coverdale* and *Salisbury*, while those of Hillsborough expanded across the Petitcodiac to form *Dover*. The new settlers of Moncton and Hillsborough extended up the Petitcodiac to *Anagance*, and up the lower courses of *Turtle Creek*, *Coverdale* and *Pollet Rivers*. The settlers of Moncton early extended to the back lands, founding *Lutz Mountain*, *Steeves Mountain* and (later) *Indian Mountain*, while those of Hillsborough founded *Surry* and *Wellington*, and other small upland settlements in that parish, either in this period or early in the next. A special and important phase of expansion of settlements of the English period consists in the early movement, from about 1790 to 1810, of settlers from Horton, Cornwallis, and elsewhere in Nova Scotia, to *Harvey*, part of *Hopewell*, including *Albert*, *Riverside*, *Hopewell Hill* and *Cape*, and *Alma*, which immigration originated in large part the settlement of the older parts of these parishes, including the *Shepody River*, *Germantown*, *New Horton*, and the coast from *Cap Enrage* through *Little Rocher* and *Waterside* to *Alma Village*. In the meantime the Miramichi settlements, a combination of English period and Loyalist with later immigrants, were extending to *Burnt Church*, *Tabusintac* and *Tracadie*, and even to *Miscou Harbour* as already noted.

g. Acadian readjustment. In parts of New Brunswick, at the head of the Bay of Fundy and on the North Shore, the Acadians had received grants of their lands from the Government of Nova Scotia, and were not, of course, subsequently disturbed in their possessions. At two places, Memramcook in New Brunswick and Minudie in Nova

Scotia, the Acadians had settled without grants, or had expanded upon lands granted to others. In these cases the grantees claimed their land, and much trouble with the Acadian settlers ensued. Ultimately the Memramcook Acadians compromised with the grantees and obtained their lands, partly by possession, and partly by purchase; but in Minudie no compromise was effected and the Acadians left their lands and, about 1800, removed to New Brunswick, founding, or helping to found, the settlements of *Shemogue*, *Dorchester Road* and *Cap Pelée* (Cape Bald). But on the St. John a more serious readjustment of the Acadians was necessary. In 1783 there was a small Acadian village at Hammond River, and over sixty families along the St. John, above St. Annes. The latter lands, however, were needed for, and included within the grants to, the Loyalist regiments, and in 1785 or 1786 most of these Acadians were obliged by the New Brunswick Government to remove elsewhere, and at the same time they were offered good lands on the Upper St. John, below the Madawaska. Accordingly the greater number of them removed to that locality, where, joining with some Canadian French from Quebec they founded, on both sides of the St. John, the Madawaska settlements which have grown, flourished and expanded to this day. Not all of the Acadians, however, were thus required to remove to Madawaska, for three small groups of them, at Upper and Lower French Villages, and at the "French location," below the Keswick, were allowed to remain and received grants of their lands, which, in the two former cases, their descendants hold to this day. The Keswick Acadians, however, afterwards left their lands, but at what time and under what circumstances is now unknown, while those at French Village, Hammond River, appear to have exchanged their lands there (granted them in 1787) for grants at Madawaska, to which they removed prior to 1794.

h. Acadian expansion and immigration. At the opening of this period in 1783, groups of Acadians, larger or smaller, were settled, either with grants of their lands or with permission from the government to occupy them, at *Fox Creek*, *Belliveau* and *Memramcook* on Fundy waters, and at *Shediac*, *Cocagne*, *Bay du Vin*, *Neguac*, *Caraquet*, *Nepisiguit*, and probably some minor points on the North Shore. In the early part of this period the growing Memramcook and Fox Creek settlements began to expand to the North Shore, and at the same time the return of Acadians from Quebec, Isle St. John and especially from St. Pierre and Miquelon, continued. From these various sources as well as from Minudie earlier mentioned, the Acadian settlements of the North Shore grew rapidly and many new ones came into existence, including *Buctouche* (1785), *Tracadie* (1784), *Richibucto Village*,

or St. Anthony (1790), *Aldouane* (1790), *Pokemouche* (1793), *Kouchibouguacsis* (1795), *Shippegan*, *Miscou*, *Barachois* (1800), *Tedish* (1800), *Aboushagan* (1802), *Shemogue* (1800), *Chockpish* (1802), *Shediac Village* (1805), *Cape Sapin* (1810), *Tabusintac*, *Cap Pelée*, or Cape Bald (1813), *Oak Point*, *Jacquet River* and *Eel River*. At least one expansion settlement from Nepisiguit, namely, *Petit Rocher* (1793), was also formed in this period.¹ A number of these settlements were not strictly Acadian. Thus *Caraquet* is locally, and no doubt correctly, said to have been founded by the sailors of a French war vessel after 1760, while *L'Amec* was settled in part in this period by Canadian French fishermen, settled here by Jersey fishing firms, while others of the northern French settlements were founded by, or contained, many Canadian French. During this period, also, the Madawaska settlements grew and expanded, extending both up and down the St. John, and even, at the close of the period (1814), sent an offshoot below the mouth of the Aroostook, forming an Acadian settlement there which, however, was soon abandoned. Some of the smaller of these settlements, notably that at Oak Point, and that at Jacquet River, were also later abandoned by the Acadians, who doubtless soon joined their fellow-countrymen in the nearest large settlements.

A special phase of settlement in this period was the establishment of post-houses along the upper St. John to facilitate travel along this important winter route to Quebec. As noted in the earlier Monograph on Historic Sites, 348, some thirteen of these were planned, but apparently not many of them were established. I have been able to learn positively of the existence of but three, outside of those at Presquise and Grand Falls in connection with the military establishments there, one two or three miles below Andover, kept by a Frenchman, L'Arlois (whose descendants, the Larlees, are numerous in the vicinity), one at Salmon River kept by Whitehead, and another seven miles below Grand Falls kept by John Street.

¹ Valuable information about the Acadian settlements in New Brunswick in 1796 is contained in a report of that year, made to the Bishop of Quebec, by Abbé Desjardins. It was printed in *Le Moniteur Acadien* for June 14, 1887. It gives *Memramcook* and *Petitcodiac*, over 100 families; *Shediac*, 15 families; *Cocagne*, 14 families; *Buctouche*, 11 families; *Richibucto*, 33 families; *Bay du Vin*, 11 families; *Neguac*, 10 families; *Tracadie*, 23 families; *Shippegan*, 5 families; *Miscou*, 3 families; *Caraquet* not stated. These numbers are probably only approximate, and they seem rather small. Another estimate, showing a slight increase over this, is given in 1803 by Alexander Taylor (*Winslow Papers*, 499).

Another very valuable document relates to the Acadian settlements in 1811, 1812; it is the Report of his Missions to these settlements in 1811, 1812 by Bishop Plessis (see Bibliography). He mentions all of the settlements in the above list excepting Cap Pelée and Chockpish.

i. Location of the Indians on reserves. Prior to the opening of this period in 1783 the Indians of the Province wandered and camped where they chose without interference from the whites, and also without any formal recognition from the whites of their rights to the soil. The rapid expansion of settlement in this period, however, soon brought white settlers upon the favourite camping and fishing grounds of the Indians, of which the latter vigorously made complaint. Accordingly, at least as early as 1783 (and indeed earlier, for in 1765 the Nova Scotia government had reserved 500 acres for them at Aucpac), the government reserved for their use large tracts of land covering their favourite camping and fishing grounds. Thus originated the system of Indian reserves which has been continued to the present and which now includes the Maliseet and Passamaquoddy reserves of *St. Croix* (on Chepedneck Lake) and *Canoose* in Charlotte; the *St. Basil* (Mada-waska), *Tobique*, *Woodstock*, *Indian Village* (Kingsclear), *St. Mary's*, *Oromocto*, *Brothers* (islands in Simonds) reserves on the St. John; and the Micmac reserves of *Fort Folly* on the Petitecodiac; *Shediac*, *Buctouche*, *Indian Island* (Richibucto), *Richibucto*, in Kent; the *Renous*, *Big Hole*, *Indian Point* (opposite Red Bank), *Red Bank*, and the part of it north of the Little Southwest, *Eel Ground* and *Burnt Church* on the Miramichi; *Tabusintac* and *Pokemouche*, on those rivers; *Pabineau* and *Indian Island* on Nepisiguit; and *Eel River*, near Dalhousie. Several thus established have become extinct either through withdrawal or early sale to the whites, including *Aucpac*, *St. Annes* and *Meductic* on the St. John, *Scoodie* (Milltown) on the St. Croix, and *Aboushagan River* in Westmorland. These reserves are of the most diverse sizes and dates of formation,¹ and many of them have been greatly reduced in size, partly by their opening to settlement (*Buctouche* and *Richibucto* in particular), partly by the sale of large parts of them to provide a fund for the benefit of the Indians. In 1867 they were all transferred to the Dominion Government at Confederation, and some of those in the above list, *St. Croix*, *Oromocto*, *Indian Island* (Nepisiguit) have been established since that time. In some cases (*St. Croix*, *Canoose*, *Renous*, *Big Hole*, *Shediac*, *Tabusintac*, *Pokemouche*) they are not now occupied by Indians, who prefer to settle in villages nearer the towns where they can secure some employment, or

¹ All the particulars I have been able to gather as to the dates of formation, size, etc., of these reserves are contained under their respective names in the Dictionary of Settlements later given. In many cases no record of dates of formation appear to exist outside of the Council Records, in which it is a matter of extreme difficulty to find them. Much information of value about them occurs in a Report by Perley, of 1844, cited in the Bibliography.

sell their wooden wares. In addition to their villages on these reserves, the Indians occupy camping places, with the tacit permission of the white owners, at various places in the province, at Gagetown, St. Andrews, Apohaqui, and elsewhere, and in the summer they temporarily take possession of other camping places, near the resorts of summer visitors. The numbers of the Indians are about stationary (1309 in 1901).

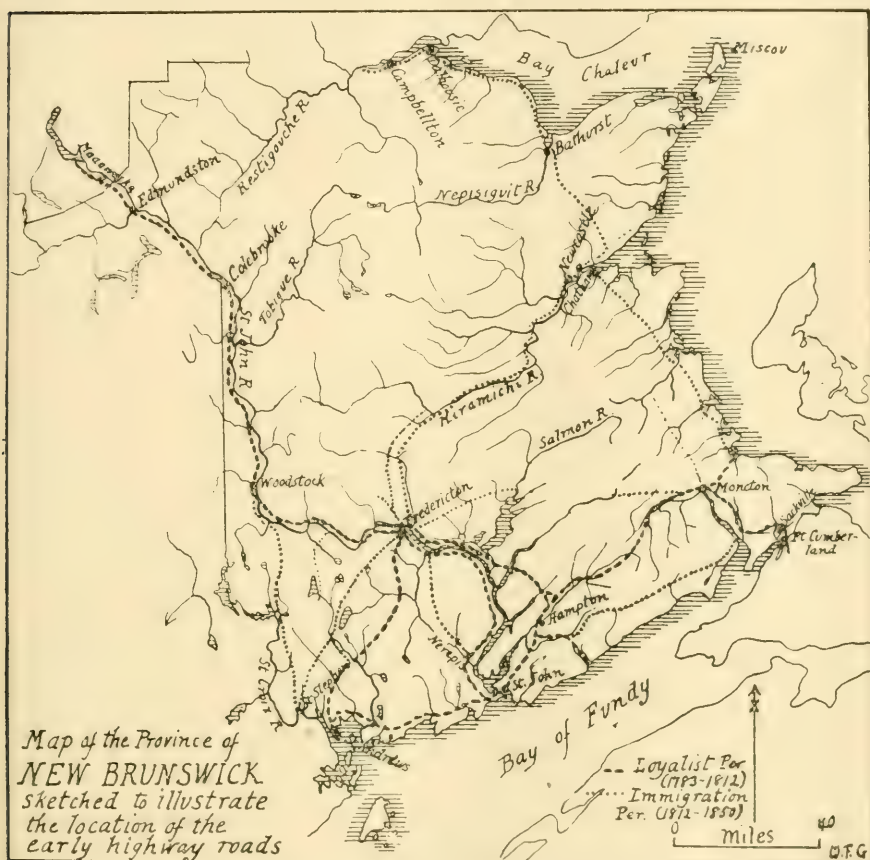
In the earlier days of the province it was customary to allow the Indians to sell their reserves. Thus, in 1794, the Indians of Aupac sold their reserves, set aside for them in 1765 by the Nova Scotia Government, to Colonel Isaac Allen, an incidental result of which was that the province in 1814 had to appropriate £300 to enable these Indians to settle on new lands, with which money the present Kingsclear reserve was purchased for them in 1816. Again, in 1800, when Rev. Mr. Andrews applied to the Council for the Indian lands at Scoodic (Milltown) for a glebe, he was recommended to purchase from the Indians. Another case is that of Simon Hebert, who, in 1821 purchased from the Maliseets at Madawaska the tract of land just below the mouth of that river of which he later, in 1824, obtained a grant. As late as 1841 the chief of the Micmacs at Red Bank sold and leased, apparently legally, large tracts from that reserve. But for many years past the Indians have not been allowed to sell their own lands.

j. Relations with earlier and neighbouring peoples. The relations of the Loyalists with the races already occupying New Brunswick were perfectly friendly. There was, it is true, some friction with both New Englanders and Acadians, chiefly due to the presence of these people as squatters on lands granted to the Loyalists, and there was a little trouble with the Indians. But these difficulties were entirely local, and soon adjusted, and no effect whatever was produced upon the distribution of settlements. Later the Loyalists and the earlier English-speaking settlers mingled and united perfectly, and, incorporating with themselves the later English-speaking immigrants, are forming one homogeneous people. The Acadians, however, and of course, the Indians, remained, as they do to-day, largely distinct peoples.

In the relations of the new settlers to neighbouring races we find little influence upon settlements. The only hostile people to be feared were those of the United States. But no serious attempt at defence against them was ever made, although small garrisons were established in 1790 at the *Forks of Oromocto*, *Presque Isle*, and *Grand Falls*, and some weak defences were established at the time of the war of 1812 at *Worden's battery* on the St. John, at *St. John* and *Carleton* (the Mar-

tello Tower) and at *St. Andrews*, but practically these insignificant local defences produced no permanent effect upon settlement.

In two indirect ways, however, the earlier settlers slightly affected the Loyalist settlements. First, they had possession of some of the most valuable lands, (*Maugerville*, *Sackville*, *Westmorland*, *Hills-*



MAP No. 10. The road along the St. John above Woodstock should be in the finer dots indicating the Immigration period, in which it was actually built.

borough, and Moncton), from which the Loyalists were thereby excluded, and second, the delay in securing the escheats of the great unoccupied grants seriously, even though only temporarily, checked the formation of the Loyalist settlements, and helped to send many settlers into the readjustment settlements of Miramichi and elsewhere.

k. Development of artificial lines of communication. The opening of this period in 1783 found the Province possessed of no lines of communication except the natural waterways and the portages between

them, and excepting a rough road, then in very bad condition, constructed by the French from Fort Cumberland to Baie Verte. But the Government of the new Province at once faced this necessity, and began the construction of roads, especially such as would connect the chief centres of population. During the next few years roads were planned, surveyed and partly built, as shown by the map, (Map No. 10), including those from St. John along the Kennebecasis, Petitcodiac and Memramcook to Fort Cumberland, from near Hampton on this road to Fredericton, from Fredericton to St. Andrews, from Fredericton to St. John along the west side of the river, from St. John to St. Andrews, from Fredericton towards Woodstock and Canada, from Moncton to Shediac and from Hampton by Upham to Quaco. So great was the labour and expense of building these great lengths of road through so rough a wilderness, that the work went on but slowly, and was often abandoned upon particular roads for long times together, a matter of no great concern to the settlers, who were accustomed to travel by water in summer and by the ice in winter, naturally preferring those easy and familiar routes to the very bad roads. So bad were they that in 1803 Dugald Campbell, a special commissioner to report on the subject, wrote that some of these roads were hardly discernible, others were used as pastures, while "10 miles of road fit for any kind of wheel carriage is nowhere to be found either there or in the rest of the Province with the exception of the left bank of the St. John in Sunbury, where nature, however, had chiefly performed the task." Work upon these roads was later continued, however, bringing gradually the Westmorland Road, the two St. John River roads and the St. Andrews road into tolerable condition, but the expenditure for defence at the time of the war of 1812 stopped all road work except that on the high road to Canada up the St. John. No doubt these roads stimulated settlement to some extent along their courses, especially in the vicinity of the larger towns, but no distinct settlements appeared to have been made upon them, excepting *New Maryland* and *Pleasant Ridge* (1808) on the Fredericton-St. Andrews road. But they were important as preparing the way for better roads and for new settlements in the next period.

B. Sociological Factors.

a. Government. The Loyalists continued the representative form of Government with a legislative capital, such as had existed in the preceding period, but the capital for the new Province was, as we have seen, fixed at *Fredericton*, thus establishing by the artificial stimulus

of government patronage, a town, later a city, near the centre of the Province, much larger than the environmental and other conditions would have developed. Moreover, in 1786, the new Government divided the Province for convenience of local administration into eight counties, each with a central shire-town to contain the local administrative offices (court-houses, jails, record and probate offices). The towns (properly parishes) thus chosen were *St. Andrews*, for Charlotte; *St. John*, for St. John; *Kingslon* (changed in 1871 to Hampton), for Kings; *Gagetown*, for Queens; *Burton* (temporarily Maudgerville), for Sunbury; *Fredericton* for York; *Westmorland* (changed in 1801 to Dorchester), for Westmorland; *Newcastle*, for Northumberland. In each case the most prominent or populous place or village in those parishes was selected as the site of the county buildings, which gave them an additional stimulus inducing a growth greater than would have been the case from natural environmental and other causes; so that in most cases those places have thus been aided to grow into the considerable villages or towns they have since become.

b. Occupations. The Loyalists had pursued in their former homes the most diverse occupations, including indeed almost every trade and profession. But the conditions of life in New Brunswick made only one occupation possible for the great majority, namely, farming, and to this they turned perforce. Hence the new settlements of the Province formed by them were almost entirely agricultural, and therefore widely spread, following the best available lands. Second in importance came, of course, trading and especially the export of lumber. This with the building of vessels, which rose greatly in importance in this period, caused a great growth of places situated in the physiographic foci of the Province. Thus not only did *St. John City* grow rapidly, but *St. Andrews* became a port of much importance, while *Chatham* and *Newcastle* on the Miramichi began to assume importance, as did smaller places on most of the larger rivers.

c. Racial character. In general the Loyalists closely resembled in character their New England forerunners. They were dominated by that desire for advancement, love of adventure, and restlessness characteristic of all Anglo-Saxons, especially when they are expanding in a new country. Consequently the settlers of this period extended as pioneers far beyond the granted settlements, and took possession in small groups or singly of points of vantage far up the St. John river and at various points on the distant North Shore. The English and Scotch immigrants, however, were more conservative, and kept rather in somewhat compact communities, either in the older settlements or

in their new settlements at *Scotch Ridge*, *Shediac*, *Miramichi* and *Restigouche*.

churches later. The expanding Acadians, however, in the same period affected the distribution of their settlements. As among the New Englanders the Loyalists spread where they pleased, organizing their churches later. The expanding Acadians, however, in the same period showed their old tendency to settle in somewhat compact villages.

C. Environmental Factors.

a. Accessibility. This factor exerted an extremely important influence upon the distribution of the Loyalist settlements, for all the Loyalists without exception were landed upon the Fundy waters, readily accessible from New York and Castine, while not a single vessel, so far as known, passed around Nova Scotia to the North Shore. Those Loyalists who ultimately settled on the North Shore either passed from the St. John to their new homes by the Indian portages, or they came into the Province by way of Quebec and Gaspé. This is in large part, though, of course, not solely the reason why the original Loyalist settlements were exclusively on waters accessible from the Bay of Fundy (compare Map No. 8), and why they reached the North Shore only in small groups and at widely scattered points. On the other hand, the North Shore being equally accessible from Europe, and, after the development of a great timber trade with the North Shore ports, even more accessible (by the timber ships) than the southern, it was peopled chiefly by Scotch and English immigrants; and the fact that the timber ships went to ports of Scotland and England and not to Ireland explains probably why no Irish reached the North Shore in this period. The timber trade appears to have developed at Passamaquoddy earlier than upon the North Shore, and it was probably the facility of passage by the timber ships that brought the Scotch settlers to settle at *Scotch Ridge* in 1803.

Another important phase of geographical accessibility was its influence upon the distribution of the Acadian settlements, which in this period were forming along the North Shore. In general those formed by settlers from Minudie and by expansion from Memramcook and Petitcodiac were either in the southernmost harbours of the North Shore, or on the portages between the Bay of Fundy and the North Shore. The Acadians returning from St. Pierre and Miquelon (or perhaps from Cape Breton) settled also in general in the southern parts, while those returning from Quebec settled mostly in the more northern localities and brought many Canadian French with them.

b. Communication. This exercised also a powerful influence upon the distribution of the settlements of the time. All navigation being by water, the settlements of the period were almost exclusively on navigable waters, the earlier upon waters navigable by vessels or boats, and the later on waters navigable at least for canoes, and the only case of an early settlement formed back from such navigable waters was *St. Davids*, which, as earlier noted, was not properly a Loyalist settlement.

Another important phase of communication was the foundation of the Acadian settlements at *Madawaska*, which were located on the upper St. John by the Government for the purpose of helping to keep open the important communication between Nova Scotia and Quebec by way of the St. John and Madawaska. And we trace yet another effect in the direction given to the native expansion settlements of the period which tended to follow the courses of the rivers, thus leading to the formation of settlements in distant places (*New Canaan* and *Carleton county*), where otherwise they would have been formed nearer the older settlements.

c. Location of good lands. The Loyalists having mostly to turn farmers, their settlements naturally tended to spread upon the good lands. The marshes, and, in some part, the intervalles, of the St. John having been taken up by earlier settlers, they spread upon the best lands remaining, occupying all of the intervalle lands of the lower St. John and its branches first, thence extending to more remote parts, and to the Miramichi and Restigouche. It was the presence of the intervalles at *Madawaska* which located the Acadian settlements there instead of farther down the St. John. At Passamaquoddy, however, the intervalles were almost absent and there the good uplands determined the settlements, especially on the good soils near *St. Andrews* and on the ridges back of *St. Stephen* at *Scotch Ridge* and in *St. David*. Along the North Shore the Acadians found an abundance of fair uplands and spread without special regard to this factor.

d. Location of trading centres. In this period the trading centres rose greatly in importance, especially in the foci of the two most extensively settled districts, namely, the St. John and Passamaquoddy. In the former the *City of St. John* rose steadily, while *St. Andrews* also grew rapidly in importance, chiefly in consequence of the great development of the lumber and shipbuilding at Passamaquoddy,¹ and these

¹ As a report by Donald McDonald in 1803 shows (*Winslow Papers*, 488), St. Andrews Parish had in that year 4 sawmills; St. Stephen had 7; St. David, 2; St. Patrick, 1; St. George, 5; Pennfield, 2; in all cutting about 7,700,000 feet of boards, while St. Andrews Parish alone had built 42 vessels since 1785. Cooney

two were the chief places in New Brunswick in this period. On the North Shore no places of importance arose in this period, the local trading centres for the still scanty population at Miramichi being at *Wilson's Point*, while at Restigouche it was at *Athol Point*.

e. Outlets of the lumber trade. The lumber trade in this period was especially active at Passamaquoddy, which, after 1800, was exporting large quantities both of square and of sawn timber, and it was also important along the St. John, but it hardly rose to any importance in this period on the North Shore. Up to 1808 much pine timber was reserved for the use of the Crown (for masts for the Royal Navy), but in that year this restriction was removed, whereby the trade in pine timber was facilitated.

f. Water powers. These rose to importance in this period, not only those of the smaller streams for sawing lumber and grinding grain for local use, but also those of greater power for sawing lumber for export and shipbuilding. About 1800 the numerous fine water powers at the mouths of the principal rivers in Charlotte were being fully utilized, thus determining important villages at *St. Stephen* and *Milltown*, at *St. Patrick* (at the mouth of the Digdeguash) at *St. George*, and probably at *Lepreau* and other places to the eastward. These rivers had a great advantage and thus received a great start over all others in the province, including the St. John, in their abundance of fine timber supply with a combination of fine water powers and good harbours at their mouths. This advantage they lost later only through the exhaustion of the lumber. On the North Shore, on the other hand, these conditions did not exist, and there the trade was entirely in hewn timber, so that those localities had to await the advent of the steam mill before they could export sawn lumber in any amount. Along the St. John the water powers of the various branches seem to have been utilized in this period chiefly for local purposes.

g. Fishing and hunting centres. This period marks a great decline in the importance of the fur trade (and other phases of hunting) as determining settlements, but the fisheries rose steadily in importance, especially the salt-water fisheries, which became increasingly important at *Passamaquoddy* and at *Miscou*, determining the settlement of the various islands by independent fishermen in the former case and the establishment of powerful foreign fishing companies, which still persist, in the latter. The salmon fisheries, too, continued important in this

(p. 50) shows that only square timber was shipped from Miramichi and in very small quantity prior to this time, and it was not until after 1812 that the timber trade became important on that river. The history of the trade at Restigouche would be similar.

period, especially on the *Restigouche* and *Miramichi*, and the fishery was a great aid to the Acadian settlements along the North Shore and in Bay Chaleur.

h. Location of mineral resources. These appear not to have determined settlements in this period, aside from the local influence of some mining of coal at *Newcastle* on Grand Lake, and of the burning of limestone at *St. John*, and to some extent at Passamaquoddy (*Letang*).

i Positions of natural charm. As before, these appear not to have been determinative of settlement in this period, excepting perhaps in the locations of individual houses.

6. THE PERIOD OF ACTIVE IMMIGRATION (1812-1850).

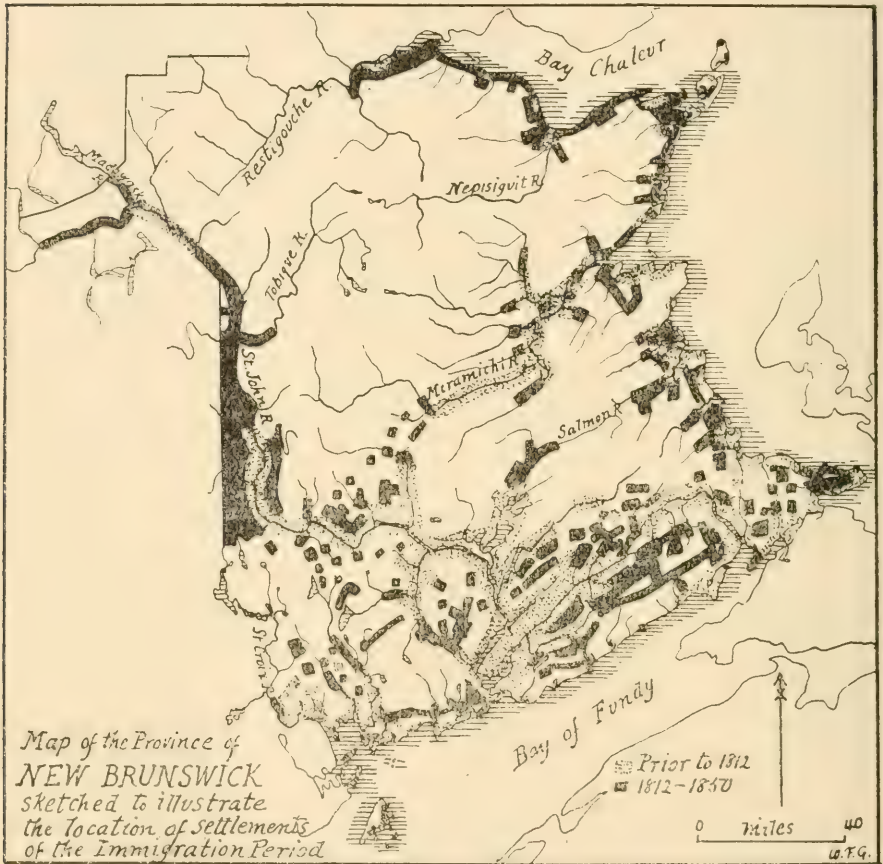
This period began with the close of the war of 1812, continued through some forty years of peaceful development marked by a steady native expansion and especially by an active immigration from Great Britain and Ireland, and closed with the partial cessation of European immigration and the beginning of a native exodus or emigration about 1850. The distribution of settlements formed in this period is shown in synopsis on the accompanying map (Map No. 11), while their origins are as follows:

A. Historical Factors.

a. Promotion of immigration by the New Brunswick and British Governments. Emigration from Great Britain practically ceased during the war of 1812, which lasted until 1814. Soon after its close the New Brunswick Government, fully convinced that an industrious population was now the great essential for the growth of the province, took steps to promote immigration. In 1816 the House of Assembly voted £1,000 for the purpose of "encouraging immigrants from Great Britain and Ireland by paying passage as an expedient." This money seems to have been used to hire a vessel which in that year brought 100 emigrants from Perthshire, Scotland, to New Brunswick.¹ What other steps were taken in the next two years, I have been unable to learn and the immigration during that time seems not to have been large; but

¹ As related by John Mann, in his "Travels in North America" (see Bibliography). Most of the immigrants of this period came out in the ships engaged in carrying lumber to England. Thus in a special Report on Immigration in 1850 (Journal of the New Brunswick Society for the Encouragement of Agriculture, etc., Part II) we read, "The great facility for procuring passages in European Ships coming to St. John for Timber has been the reason why so many Immigrants have arrived there, and will probably continue to be an inducement for many more to come during the continuance of the present Timber Trade."

in 1819 a very active emigration from England, Scotland, and especially Ireland, began, and in that year some 7,000 immigrants, chiefly from Ireland, reached St. John. It was not, of course, the efforts of the New Brunswick Government alone which produced this remarkable result, but it arose in large part from the failure of the



MAP No. 11.

potato crop in Ireland, and other bad economic conditions in that country. Once started, however, this stream of immigration continued without cessation for some thirty years, varying, of course, from year to year, but reaching its culmination from 1834 to 1843, in each of which years from six to eight thousand immigrants (many of whom, however, passed on to the United States) reached the province. Unfortunately no statistics of immigration through these years have been, so far as I can find, preserved; and we possess only isolated refer-

ences with an occasional official table. All the facts as to the numbers of immigrants that I have been able to find, compiled from diverse sources, are contained in the following table:

1816. A vessel brought 100 immigrants from Perthshire to St. John.
1819. Some 7,000 immigrants, chiefly from Ireland, but with some from Scotland, and some disbanded regiments, reached St. John.
 Another record gives for this year, immigrants from Dumfries 150, Cardigan 180, Falmouth 17, London 38, Ross (Ireland) 110, Londonderry 1,312.
1821. Aug. 28. Ship Mars, Frier, arrived at St. Andrews from Belfast with 210 passengers.
1822. June. Reached St. John from Scotland, 50 immigrants, England, 55; Wales, 66; Ireland (Londonderry), 1,390.
1826. July 1. Upwards of 1,550 immigrants have arrived at St. John since April 30, many in a very distressed condition.
1826. Oct. 7. 3,000 arrived at St. John since 30 April.
1829. June. Arrived from England 146, from Ireland 2,064.
- 1831-1835. 30,000 immigrants arrived in St. John, of whom many appear to have gone on to the United States.
1834. Some 8,750 immigrants appear to have reached the Province.
1835. During the last five years, the average number of emigrant arrivals was 6,000 annually; during the five preceding years, 5,000 per annum was the average. The departures, during the same periods, were 2,500 per annum (Wedderburn, 74).
1840. May. In 2 days 875 immigrants arrived at St. John.
1841. May 15. Sailed for St. John, 5 vessels from Cork, 2 from Kinsale, 3 from Londonderry, 1 each from Belfast and Westport, containing 1,991 passengers.
1842. July 16. 7,000 immigrants arrived at St. John the present season. Another note says, from April to July 7,000 arrived at St. John, most of whom went on to the United States.
1843. Jan. 1—Dec. 31. 8,320 immigrants came to the Province; St. John, 7,565; Miramichi, 332; St. Andrews, 423.
- 1844—2,605; 1845—6,133; 1846—9,765; 1847—14,879; 1848—4,141; 1849—2,724; 1850—1,838.

As the above figures indicate, the greater part of the immigration of this period was from Ireland, a condition contrasting sharply with that of the preceding period, in which it was chiefly from Scotland. Happily we have very exact data upon this subject of the nationality of the immigrants of this period, for the census of 1851, taken at

about the close of the period, gives separate lists of the immigrants from each country. The figures of the countries are as follows:

County	England	Scotland	Ireland	Other Brit ^h Possessions	Foreign	Totals	Percentage of Total Population
Albert	81	56	377	156	53	723	11.4
Carleton	131	148	1,101	88	89	1,557	13.9
Charlotte	234	391	2,569	74	364	3,632	18.2
Gloucester	132	219	827	161	37	1,376	11.7
Kent	240	448	463	19	25	1,195	10.4
Kings	372	253	2,718	81	69	3,493	18.5
Northumberland	306	895	2,095	124	63	3,483	23.1
Queens	173	155	1,377	57	30	1,792	16.8
Restigouche	50	534	282	24	31	921	22.1
St. John	1,133	896	12,872	509	394	15,804	41.0
Sunbury	50	68	809	62	47	1,036	19.5
Victoria	78	37	218	118	39	490	9.0
Westmorland	303	345	706	3	31	1,388	7.7
York	624	410	2,362	74	72	3,542	20.0
	3,907	4,855	28,776	1,550	1,314	40,432	20.8

Thus it appears that the Irish far outnumbered all other immigrants taken together, formed 71% of the total immigration, and constituting, in 1851, 14.9% of the total population of the Province. Next after the Irish came the Scotch, only one-sixth as many, then the English. The immigration from "other British Possessions" must have been from the neighbouring provinces chiefly, and that from "foreign countries" chiefly from the United States.

As a rule the immigrants were extremely poor, commonly landing in the Province with absolutely no possessions, even their passage in many cases having been paid by Government. It was necessary, therefore, not only to provide assistance until they could become self supporting, but to grant them lands upon the easiest possible terms.¹ In 1820 the

¹ "In the year 1819 when Lt.-Gov. Geo. Stracy Smythe was at the head of affairs in this Province, there was much distress among the newly arrived immigrants, and a meeting was held in St. John for their relief, at which a subscription list was opened and headed by His Excellency with £100. At Fredericton a similar meeting was held Nov. 30, and a committee appointed to consider and

New Brunswick Legislature passed "an Act to provide for, and encourage the settlement of emigrants in this Province," in which it was provided that certain persons in each county should act as a committee to inquire into the character and condition of emigrants, and, where satisfactory, recommend them for location tickets for lands to be laid out and surveyed in each county. Apparently it was under this law that the numerous emigrant settlements of this period were laid out and settled. The emigrants occupied their lands simply by location tickets until they were able to pay the moderate fees, quit

relieve, if possible, the situation of the many distressed immigrants in and about that place. The committee proceeded to visit the habitations of these unfortunate people, and with few exceptions found them uncomfortably lodged and by no means prepared to meet the approaching winter." (Old newspaper.)

No doubt this meeting led to the formation of the following society:

"The Fredericton Emigrant Society. This Society was formed at Fredericton in 1819, for the relief of destitute strangers, being the first institution of that kind formed in the Province. It expended large sums in that and the following years, and besides relieving the temporary necessities of great numbers of destitute emigrants, enabled many of them to settle on new land, who are now in comfortable independent circumstances. It is not at present in active operation, but has funds to a considerable amount." (Sketches of New Brunswick, 35.)

This Society proved unable to meet the demands upon it and in 1825 Sir Howard Douglas recommended legislative action to meet the situation. In his address he says "the destitute and distressed condition of emigrants on their first arrival has been such as to render the benevolence of the Emigrant Societies and that of individuals altogether insufficient for their relief, and their poverty and ignorance of the labour of the country preventing them from making immediate settlements upon land." As a result of his efforts the New Brunswick Agricultural and Emigrant Society, a provincial institution with branches in the different counties, was founded in 1825 to aid emigrants. The latter were to be placed temporarily under its charge and to be located on their lands under its direction. This institution appears not to have accomplished what was expected of it and in a few years it disappeared. It was not however, a cessation of poverty which led to its decline, for this characterized most of the immigrants throughout the period. Thus in 1848 a speaker in the House of Assembly referred to "the clouds of wretched people who had landed upon our shores during the past season" (Fenety, Political Notes, 262). It is, however, greatly to the credit of the great majority of immigrants that once given a fair start in this country they rapidly rose from want to comfort and often to affluence.

In 1832 a law was passed requiring that the masters of vessels arriving in New Brunswick with emigrants should pay to the Province five shillings for each emigrant, the proceeds to be used solely for the relief of distressed emigrants upon arrival, or for conveying such to their destination within the Province. This tax provided £2,183 11s. 8d. in 1834.

rents, or purchase money, after which grants were issued to them giving possession of their lands in fee simple.¹

Presumably the New Brunswick Government in its efforts to promote immigration, issued many publications during this period, but I have found but a single one—a 15-page octavo, "Hand-book for Emigrants to the Province of New Brunswick," Fredericton, 1841, which gives in the form of questions and answers, a synopsis of the facts likely to interest intending immigrants. Three emigration works published by individuals, however, are of considerable importance, Mann's "Emigrant's Instructor," 1824; Baillie's "Account of New Brunswick," London, 1832, and an anonymous pamphlet, "Practical Information to Emigrants into New Brunswick," published with MacGregor's *British America* in 1832, all of which works contain much valuable information about the earlier immigrant settlements. Mann's two works give a very clear picture of the conditions and hardships of an emigrant's life, invaluable to a clear understanding of the history of emigration to New Brunswick.²

But not only did New Brunswick encourage immigration, but the British Government did likewise. In 1827 Colonel Cockburn was sent to New Brunswick to select 300,000 acres of good and accessible land for settlement by emigrants. He chose large tracts in the interior of

¹ From the foundation of the Province until 1827 lands were granted on the payment of certain fees which went to the Lieutenant-Governor and other principal officers of the Government (a table of which is in Fisher's *Sketches of New Brunswick*, 79), and from 1808 to 1827 a small quit rent, which was to be perpetual, was paid in addition. In 1827 all grant fees were abolished and lands were sold through the Crown land office either by absolute purchase or quit rents for seven years. The quit rents, which in 1832 were estimated to amount to £2,324 sterling per annum, appear not to have been collected, at least not as a rule. In 1837 His Majesty transferred the entire control of Crown lands to the legislature, since which time most of the changes made in the regulations for the sale of Crown lands have been in the direction of cheapening their cost to the poor settler. (Brief accounts of the different systems of granting Crown lands are in Robb's *Agricultural Progress*, 1856, 13, and in *First Report of the Crown Land Department*, 1862, 7.) Various minor changes were made rendering easier the acquisition of lands by emigrants until in 1849 an Act was passed allowing payment to be made in labour on the public roads instead of in cash. The consideration of the settlements thus made, however, belongs rather under the next period.

² Dr. Raymond possesses a MS. book of verses by Philip Kehoe, an emigrant of 1820, giving a vivid account of life on an Emigrant Ship.

A work of great value on the origin of settlements in this period is Johnston's *Travels in North America* (see Bibliography) which gives many references to this subject, and the second edition of his report is almost equally valuable. There is much of importance also in MacGregor's *British America*.

Albert County and in a line across the heads of the rivers of Kent County, and it was under his advice that the road in a direct line from Moncton towards Chatham was laid out and partially built as far as the Richibucto. But despite his enthusiastic reports, no settlements appear to have been made on these tracts in this period, and it was not until the native settlements of Kent expanded to them that they were occupied.¹ Colonel Cockburn's Reports, in a British blue-book of 1828, are of great interest and give much valuable information about the country at that time. Presumably many British blue-books on emigration were published during this period, but I have been able to find only a single one, namely that published in 1843, and containing some brief references to New Brunswick. One naturally would expect that a collection of all official reports and other papers relating to emigration, which has played so great a part in the peopling of New Brunswick, would be found in the library of the Legislature or in some of the Government offices at Fredericton. But such is not the case.

The immigrants who arrived in the Province in this period finally settled in either one of four ways. *First*, they distributed themselves among the older settlements, either taking up farms in the settled districts or their immediate vicinity, or else they settled in the towns and cities. Thus they aided to consolidate and enlarge both the older settlements and the towns, and the tendency towards the latter is well brought out by the census of 1851, which shows (see the table earlier) that the Irish in particular settled most numerous in the counties and parishes having the largest towns. Probably the majority of immigrants thus settled in the older settlements. *Second*, they joined with the native settlers who were expanding into and opening up new lands in various parts of the Province, helping to form new settlements of mixed origin. *Third*, they proceeded either immediately or after some short interval, to blocks of land laid out for them in the wilderness lands of the Province, there forming those farming settlements of marked nationality so characteristic of New Brunswick settlements and a list of which is given below. *Fourth*, they passed along, either immediately or after some short residence in the Province, to the United States, a procedure which became more and more marked towards the end of the period. Further, those settlements, composed of immigrants exclusively, were formed either by considerable numbers who came together, usually from a single home locality, or else by constant small accessions extending over several years, new arrivals being stimulated by the reports of the

¹ Cooney in 1832 spoke very slightly of this enterprise, which had obviously been a failure (Northern New Brunswick and Gaspé, 152).

earlier settlers, who often induced their former fellow townsmen to join them. *Richibucto* and *Belledune* were largely settled in this way.

The distinct settlements founded in this period by immigrants from Great Britain and Ireland were as follows. I have found none of date certainly prior to 1819, although it is possible that some of the group near New Jerusalem in Petersville may be earlier, but in that year and the next (1819-1820) were formed the Welsh *Cardigan*, the English *English Settlement*, and *Murray's Corners*; the Scotch *East Scotch Settlement*, *Caverhill* and *Scotch Lake*; the Irish *Tay*, *New Bandon* and *Belledune*; and these appear to be the pioneer settlements of this period. Others, however, followed rapidly, and during the decade from 1820 to 1830 the following were formed:—the Scotch *Mascareen* and *Letang*; *Gaspereau* (Queen's), *California* (Queen's), *West Scotch Settlement*, *New Scotland*, *MacDougalls* and its extension *Scotch Settlement*, *Black River*, (near Buctouche), *New Galloway*, *Napan* and *Douglstown*; the Irish *Baillie*, *Newburg*, *Magundy Ridge*, *Blaney Ridge*, *Pokiok Settlement*, *Lake George*, these latter four from north of Ireland,¹ *Birdton*, *Kingsley*, *Salmon Creek*, *North Fork*, *New Jerusalem*, *Cootes Hill*, *Henderson*, *Irish Settlement*, *Waterloo*, *Shannon*, *Chambers Settlement*, *New Ireland*, *Irish town* (Westmorland), *Second Westcock*, *Botsford Portage*, *Bartibog*, *Nelson*, *Barnaby River*, *Cains River*, *Pokemouche*, and *Shannonvale*. In this decade also, a small group of French from France and Jersey settled at *Grande Plaine*, Miscou. Groups of immigrants settled also with the native settlers in Richmond at *Scotch Corner* and *Irish Settlement*, in *Howard Settlement*, and in *New Maryland* (Scotch).

During the following decade, 1830 to 1840, there were formed the important settlements of the New Brunswick and Nova Scotia Land Company, later considered, the important English and Scotch *Harvey*, the Scotch *Wilson's Point* (on Miscou), *Rose Hill* and *Dunlop*, and most of the Scotch settlements on Bay Chaleur later noticed; the Irish *Clarence Hill*, *Smithfield* and *Newmarket* (North of Ireland), *Lawfield*, *Hibernia*, *Red Bank*, probably *Jordan Mountain* and *Whites Mountain*, *Emigrant Settlement* (Westmorland), *Emigrant Settlement* (St. John), *Upper Bay du Vin*.

In the next decade, 1840 to 1850, fewer new settlements were formed, but they included the Scotch and Irish *Tryon*, *Allandale* and *Kilmarnock*; the Scotch *Roxburgh*; the Irish *Anderson Settlement*, *Cork* (Teetotal Settlement), *Acton*, *Carlow*, *Flume Ridge*, *Boland*,

¹ It would perhaps be more logical to divide the Irish settlements into two groups, the Protestant north of Ireland settlers, and the Roman Catholic south of Ireland settlers, but I have not the facts for doing this in all cases.

Enniskillen, Patterson, Boyne, Clones, Dingletycough, Londonderry, Donegal, Long Settlement, Fredericton Road, Kinsale.

It was during this period that the remarkable Scotch emigration to the Restigouche and Bay Chaleur began, which converted that region from a scantily peopled wilderness into a well settled and progressive part of the province. These settlers were mostly from the Island of Arran, and, according to Herdman (in his History of Restigouche), left their native land because their leases had expired, and their landlord, the Duke of Hamilton, refused to renew them. The first arrivals were in 1829, and thereafter they continued to come for some years. A few of them settled above the older settlers on the Restigouche, and others between Campbellton and Dalhousie, but they extended gradually beyond that, taking up the coast lands through *Colborne* and *Durham*, mingling somewhat with Acadian settlers between Eel River and Charlo River, as far as Belledune, and with the exception of a few places already occupied (at Jacquet River, New Mills and elsewhere) they founded the prosperous farming districts and villages of that region, and have expanded to a considerable extent upon the back lands. Scotch settlers from Pictou, Nova Scotia, also came, especially to the lumber towns now rising at the mouth of the Restigouche (*Campbelltown* and *Dalhousie*) during this period. In the meantime there was also a considerable Scotch immigration to the Miramichi, both from Scotland and Nova Scotia, and probably from Prince Edward Island. Except in the case of Douglastown and Napan, already mentioned, no distinct settlements were formed, but the new immigrants joined with the earlier settlers in building up the now rapidly growing lumbering towns of *Chatham* and *Newcastle*.

A special phase of immigration in this period was the introduction of men to work on the construction of the St. Andrews and Quebec Railway, and who afterwards settled in the province. The most important group of such settlers were the 100 labourers sent to St. Andrews in 1847 by Earl Fitzwilliam from his estates at Wicklow Island, but the consideration of this subject belongs rather in the next period.

A very important factor in the immigration of this period was the New Brunswick and Nova Scotia Land Company. This company was formed in England through the activity of Lieut. E. N. Kendall, who is said to have become impressed with the possibilities of New Brunswick during a visit made in connection with the boundary surveys.¹

¹ St. John Sun, July 15, 1887.

It was first organized in 1831, or early in 1832, was incorporated by Royal Charter in 1834, and in November, 1835, purchased from the Government 589,000 acres of land, at three shillings per acre. This tract was located in York County, of which it occupied much of the northern part, with limits shown on a later map (map No. 16). The grant inclosed Cardigan and some other grants, and some lands purchased from the Cunards were added to it on the southwest Miramichi, on which Campbell settlement was built. They proceeded with great energy to build a road from the Royal Road near Cardigan through to the Miramichi, and where it crossed the Nashwaak they laid out the village of *Stanley*, and at its junction with the Miramichi they laid out another village of *Campbell*, while along its course, in the vicinity of Tay and Cleuristic, they built log houses and cleared lands for expected settlers, all of which operations were most expensive. They circulated large amounts of printed circulars, etc., and attracted some settlers, the first of whom, some Isle of Skye crofters, became greatly dissatisfied, and abandoned their lands, which are still unoccupied and growing up to forest. But later the company was more successful, and towards the end of this period and in the next they founded, partly by the introduction of immigrants and partly by the sale of lands to natives of the province, *Stanley, Cross Creek, Giants' Glen, Greenhill, Scotch Glen, Williamsburg, Maple Grove, Bloomfield Ridge, Fredericburg, Stone Settlement, Curleyburg, Ward and Campbell Settlements, Red Rock, Limekiln (or English Settlement)*, and others in the parish of Stanley, and also *Dorn Ridge, Jones' Forks, New Zealand, Upper, Middle and Lower Haynesville, Springfield, Millville, Howland Ridge, Blaney Ridge, Temperance Vale, Campbell Settlement* and others in Douglas, Bright and Queensbury. The company's operations, however, were not profitable, partly because of the great expense and small returns from the introduction of immigrants (their profits were to accrue from the sale of lands to the settlers after they had become able to pay), partly because much of their lands proved unfit for settlement, but chiefly because of the gradual reduction in price of lands sold to settlers by the province, which ultimately sold the best lands to settlers not only at a price below the original price paid by the company for theirs, but even granted them practically free (under the Labour Act). Accordingly, in 1872, steps were taken towards the voluntary winding up of their affairs, a process not yet completed. Over two-thirds of their lands have been sold either for settlement or for lumbering purposes having being largely bought, for the latter purpose, by Alexander Gibson, founder of Marysville. The present resident commissioner,

to whom I am indebted for much information about the company, is Mr. Harry Beckwith, of Fredericton.¹

b. The settlement of the disbanded regiments. Early in this period important settlements were formed by the men of disbanded regiments, some from New Brunswick and some from Great Britain. In 1803 a regiment had been raised in the Province called the *New Brunswick Fencibles*, which in 1811 was gazetted as the 104th regiment of the British line, and which took an active part in the war of 1812. In 1813 it was ordered to Canada, and a new regiment of New Brunswick Fencibles was raised for home defence.² At the close of the war both of these regiments, together with the 8th and the 98th British regiments were disbanded, and were offered lands in New Brunswick. In 1817 the New Brunswick Government made a reservation of the lands along the St. John from Presque Isle to Grand Falls (then unoccupied except in a few small single grants), and gave notice (May 2, 1817) that all officers and men of this regiment who desired lands should give their names to the secretary's office. A considerable number both of the 104th and of the Fencibles took advantage of this offer and settled, apparently in 1817 and 1818, on the St. John in the present parishes of *Wicklow, Kent, Andover* and *Perth*, and with and above them men of

¹ A most valuable document upon the history of the operations of this company is "Reports Nos. 1 and 2 on the state and condition of the Province of New Brunswick, with some observations on the company's tract" by E. N. Kendall, 1835. London. 31 pages. The company appears to have issued a great amount of literature relative to their tract, for the early expenses included £135 for engraving maps and printing, as well as £54 "for town and provincial advertisements." A part of the above amount was probably paid for the publication of a series of 12 large lithographic plates (of which I possess a set) showing scenes about Stanley, Fredericton and on the company's road, entitled "Sketches in New Brunswick. Taken principally with the intention of shewing the nature and description of the land in the tract purchased by the New Brunswick & Nova Scotia Land Company in the year 1833; and of illustrating the operations of the Association during the years 1834 and 1835." London. Published March 1st, 1836, by Ackerman & Co., Strand. To the preliminary operations in connection with the formation of the company we owe also the beautifully engraved Map of New Brunswick of 1832 (the best of the Province up to that time) by Thomas Baillie and E. N. Kendall, the first to show the Land Company's tract. No doubt there was a great deal of other printed matter issued in connection with the operations of the company but nothing is known of it (nor indeed of the publications above mentioned) in the company's office at Fredericton. There have been four Commissioners, Lieut. Kendall, Col. Hayne, Mr. John A. Beckwith and Mr. Harry Beckwith. See also *Notitia of New Brunswick*, 105.

² The best history of these regiments is by Raymond in his *Carleton County Series* 79, 80, 83, 84, 85.

the 8th and 98th regiments were also settled.¹ These new settlements thus formed were long known as the *military settlements*. Another tract was laid out for these regiments, especially for the 98th, along the Fredericton and St. Andrews road between the Oromocto and Magaguadavic, but the lands here, where settled at all, were mostly soon abandoned, so that this location originated only the present small settlement at Piskahegan.² Yet another military location laid out at this time (June, 1818), for the 90th regiment, on the portage between the Nashwaak and the Miramichi, was likewise scantily settled and soon abandoned. A year later in June, 1819, the West India Rangers, another British regiment, was disbanded at St. John, and some sixty of its members accepted the offer of lands and were settled on the east side of the river above the Tobique, founding there the present *Ranger Settlement*, while one of the men later founded *Prosser Brook Settlement* in Albert.

c. *Immigration from the United States.* During this period there was a considerable immigration from the United States, and it is probable that practically the entire number of immigrants, 1,344, given in the census of 1851 as from "foreign countries" were from the United States. This immigration seems to have had but a single impulse and motive, namely, the desire of certain progressive individuals to take advantage of the opportunities offered in the growing province, especially in the timber trade, and most of the Americans who came to New Brunswick in this period seemed to have been connected with lumbering. In the early part of the period there was a great and profitable exportation of pine timber from all the principal rivers of New Brunswick and in this they engaged. Some of these persons made their homes in the province, as the census implies, but many others appear to have resided here but temporarily, returning later to their native land. Thus in 1825, Fisher in his "Sketches of New Brunswick," says (page 57), "Formerly the woods swarmed with American adventurers, who cut as they pleased," and again he speaks of the extent to which Newcastle and Chatham have suffered from non-resident lumbermen, though these may not have been all Americans.

¹ Presumably these regiments were settled in blocks, keeping men of the same regiment together, but I have not been able to separate them with the data at my disposal, excepting that it is said locally that the "Kent Regiment" was settled from River de Chute to Aroostook.

² These lands were mostly of extremely poor quality. Many such mistakes have been made in the location of settlements in the Province, indeed, the entire past management of immigration by the Province, exhibits the vacillation, inefficiency and expensiveness apparently inseparable from the conduct of affairs by democratic governments.

For the most part these American immigrants scattered among the older settlements, but in a few cases they formed distinct settlements, of which the most important formed in this period was that of *Boiestown*, founded about 1821 by a group of Americans headed by the energetic Thomas Boies, and this settlement afterwards attained to much importance, some of which it still retains. *Stymest settlement* on the Tabusintac and *Berry's Mills* near Moncton are others of this origin,¹ while *Shirley*, near Oromocto, is a growing settlement said to be thus founded. In this period, also, many more Americans settled at Grand Manan, and some along the upper St. John above Madawaska. There was also some movement of Americans across the international boundary into Carleton County, notable to *Parks Hill*, *Union Corner* and elsewhere.

Of a very different character was another immigration from the United States in this period. During the war of 1812 many slaves in Maryland and Virginia escaped from their masters and found a refuge on the British war vessels in Chesapeake Bay. At the close of the war, in 1815, some 300 of them were brought to St. John, and in 1817 were assigned lands near Loch Lomond, where they founded the present negro settlement at *Willow Grove*, now small and declining. Other negroes, fugitive slaves from the Southern United States, came later to the Province, but they settled in the towns, forming no new settlements, and later some of them removed to Sierra Leone.² The negro settlement at Otnabog has another origin, as earlier noted.

d. Native expansion. Throughout this period the native settlements were also steadily expanding. This took the form both of consolidation and extension of existing settlements as well as of a movement to new lands, either to neighbouring uplands or to the uppermost courses of the rivers. In Charlotte there was expansion up the St. Croix, to *Lynnfield*, *Pinkerton* and *Anderson* on the back lands, up the Digdeguash to *Rollingdam*, *Whittiers Ridge* and other places, to *Brockway*, and to parts of *Pennfield*. From the St. John river settlements there was expansion to *Howard Settlement*, to *Durham*, up the Nerepis to *Petersville*, to *London Settlement*, to *Hardingville*, *Golden Grove*, *Damascus*, *Barnesville*, probably to *Campbell Settlement*, *Markhamville*, and other places between Hammond river and Kennebecasis, *Goshen*, *Cornhill*, *Samphill*, *Traceyville*, *Victoria*, *Campbell Settlement*, *Oldham*, *Springfield*, *Dorrington Hill*, and minor places. Very

¹ The names Fish, Sargeant, Willard, Coll, Witherell, Cushman, on the Miramichi are said to be those of American immigrants of this period.

² Smith's History of Methodism, which contains valuable material on this subject. An important article on the negro in New Brunswick is by Raymond in "Neith," (St. John, N.B.), Vol. I, 27.

important, however, was the expansion in this period in Carleton county, for the back lands were steadily taken up, partly by expansion of the river settlements and partly by new accessions from the older Loyalists and New England settlers on the lower St. John and thus were formed the settlements filling the parishes of *Richmond*, and the back lands of *Wakefield*, *Wilmot* and *Wicklów*, all of which were taken up before the close of the period, including the settlements of *Kirkland*, *Richmond*, *Jackstown* (commenced in preceding period), *Williamstown*, *Good* and *Long Settlements*, and peopling this part of Carleton county with an almost pure native population.¹ On the other side of the St. John, the settlements were not so extensive because the lands were not so good, but the same native settlements extended to the back lands of *Peel* and *Brighton*, and especially extended up the Becaguimée, giving this valley, like the opposite side of the St. John an almost pure native population, and established *Rockland*, *Windsor* and *Coldstream* settlements. In this period, also, began the native expansion up the *Tobique*, which, however, was most active in the next period. There was also some expansion up the St. John to *Colebrooke* at Grand Falls, and above to unite with the Acadian settlements, and beyond the Acadian settlements above the Madawaska, where a number of native settlers, with some American and some Irish immigrants, spread thinly along the river to St. Francis, before the end of the period.

In the meantime the native settlements in the Petitecodiac Basin were also extending around *Meringuin* peninsula from Westcock and Dorchester Cape, up North River, founding *Wheaton*, *Steeves* and *Lewis Mountain*, *Indian Mountain*, and up to the heads of Turtle Creek, Coverdale or Little River and Pollet River, originating *Little River* (Elgin), *Elgin Corner*, *Pleasant Valley*, *Mapleton*, and the upland

¹ The following from a newspaper article by Rev. Dr. Raymond throws much light on this settlement and is doubtless typical of the whole.

"From Woodstock the settlements gradually extended upwards and backwards from the river. A large tract of land could be obtained merely by paying \$20.00 or \$25.00 for the grant, and it was a common custom for four or five men to club together, select their land, pay for the grant, and then draw lots for the part each was to take. The next step was to cut out a path from the nearest settlement to their farms, clear a small piece of land, and build a small house of logs, the roof of which was frequently covered with bark from the spruce tree."

In 1818 Jacksontown [i. e., the present Jacksontown, not Jacksonville], was settled in this way by Messrs. Cole, Kearney, Churchill, Burtt, Freeman and others. Four years later Messrs. Jamieson Kirk and Porter settled at Richmond, or as it was formerly termed, "Scotch Corner." The following year, in 1823, Andrew Currie crossed the "big swamp," and settled in North Richmond. Captain W. Mackenzie located himself in South Richmond or "Mackenzie's Corner," and Messrs. Atkinson, Strong and McKee founded what was termed the "Irish Settlement."

settlements of *Gowland* (commonly misprinted *Golden*) *Mountain*, *Church Hill* and *Midland*. Upon the back lands of Albert the older settlers joined by a few immigrants, founded (chiefly from Hillsborough), *Baltimore*, *Irving*, *Berrytown*, *Dawson*, *Round Hill*, and (from Hopewell) *Chester*, *Caledonia*, *Memel*, *Woodworth*, *Curryville*, and (from Alma) *Hastings*. In Westmorland, it was expansion of the older settlers joined by occasional immigrants which established in this period, *Beech Hill*, *Fairfield*, *Cookville*, *Mount Pleasant*, *Aboushagan Road* and *Anderson*. The *Black River Settlement* of Northumberland extended up that river, and the native settlers up *Bay du Vin River*, while *Youghall* was settled by both native and immigrant settlers. An expansion from Jacquet River formed *Boyle Settlement*.

During this period also some of the immigrant settlements dating from early in the period had time to expand to new settlements before its close. Thus, the military settlements expanded to the present *Carlingford*, Cardigan appears to have expanded to *Hamtown* and *Woodlands*, New Bandon to *Innishannon*, and *Black Rock*, the Scotch of Durham to *Archibald Settlement*, and those of Dalhousie to the back lots including *Dundee*, *McKinnon* and *Russell* settlements.

An important feature of native expansion in this period was the formation of the Mechanics' Association settlements from St. John.¹ The years following the prosperous expansion of the timber trade in the 30's were years of great business depression in New Brunswick, throwing many mechanics in the cities out of work, entailing great distress. In order to relieve this, associations were formed in St. John to settle these unemployed mechanics upon farms, and in 1841 to after 1843 at least three of such settlements were formed, the *Mechanics' Settlement* in Kings and Albert, the *Maxwell Settlement* on Eel river and *Mount Theobald* in St. John. All of these were settled but they were partially abandoned on the return of good times, the latter entirely so.

Another important phase of expansion in this period was that of the Acadians. Those of Madawaska spread both up and down the St. John, a small group apparently settling temporarily as far down as the mouth of the Aroostook, and a number extended above the mouth of the Madawaska.² The French settlements of Kingsclear expanded to *Myshrall Settlement*. Those of the Petitcodiac spread in part down that river from Fox Creek, and up from Belliveau until they were separated only by the Hillsborough extension settlement of Dover, and thereafter they joined their fellow countrymen on the North Shore.

¹ On these, see Gesner, New Brunswick, 144 and 171.

² Their distribution in 1840 is shown with the greatest clearness on a special map in the British Boundary blue book of that year.

Those of Memramcook spread to *Bonum Gould*, along the Moncton and Shediac roads, *Dorchester Road* and *Scadouc*, and to the North Shore. Early in this period the important settlement of *Cape Pelée* (Cape Bald) was formed by settlers from Fox Creek, Memramcook and Minudie, and *Kouchibouguac* (*Cormier*), *St. André* and some smaller settlements in the vicinity were also formed at this time. The Shediac settlements spread somewhat to the back lands, forming *Cohoon* and *Weisner*, those of Cocagne and Buctouche expanded to form *Ohio*, *St. Anthony* and *White Settlement*, those of Buctouche to *Pelerin* and *St. Mary's*, those of Aldouane and Kouchibouguac extended up those rivers and to the uplands between them, those of the north east corner of the province filled up the coast, including *Grand Anse*, expanded on *Shippegan* and extended to the uplands, while those of Petit Rocher extended to *St. Jerome*, *Robertville* and *St. Louise*.

A special phase of native expansion in this period was connected with the throwing open of parts of the great Indian reserves on the Buctouche and Richibucto in 1822, which lands were rapidly taken up apparently by native settlers, mostly by Acadians on the Buctouche and by other native settlers on the Richibucto. No doubt the opening of the timber reserves in 1825 was also followed by expansion into those lands, and some peculiarities of settlement in the province may be thus explained, though I have not traced these out.¹ Yet another phase of native expansion, or rather of movement of the native population, was determined by the great Miramichi fire of 1825, which sent many settlers from that river to other parts of the Province, notably to Belledune, and probably to Richibucto and elsewhere.

Connected with settlement in this period was the speculation in lands, formerly known as the time of the *land fever*, which culminated about 1835 in the purchase of large blocks, largely by Americans, for lumbering purposes, and for speculation in lands, lumber, and water-privileges. Many of these were subsequently cancelled for default of payment, but others were paid for and held, and thus the large tracts in western York County, held for lumbering purposes, came into private hands. Later, towards the end of this period, and especially in the next, land speculation became very active and almost a public scandal, greatly to the detriment of the interests of the province.²

e. Relations with earlier and neighbouring peoples. This period throughout was a time of profound peace, both internal and external. The older settlers received the newer with welcome and both merged

¹ The locations of these reserves in 1820 are shown on Bonnor's Map of that year.

² As fully set forth in a "Report from Select Committee in subject of the Crown Land Department" . . . Fredericton, 1861.

together as one people, and all foreign relations were friendly. Hence settlement was not affected by this factor in this period.

f. Artificial improvements in communication. This period was one of active road building in New Brunswick, practically all of the great lines of communication being completed in this time, and this road building powerfully affected the distribution of settlements.¹ During the war of 1812 all road-building effort had been, for military reasons (that being the only British winter route from the sea to Canada), centred upon the road to Canada, which ran by the St. John and Madawaska to Quebec, but it was not completed for many years. After the close of the war work was at once resumed upon the other roads. Those built in the earlier period (as shown on Map No. 10) were improved, large numbers were built along the river valleys and along the coasts from one settlement to another, and the new trunk lines between the great centres were taken up and completed in approximately the following order: That from Fredericton along the Nashwaak valley to Miramichi was finished about 1819; the old Nerepis road from Fredericton by Oromocto and the Nerepis to St. John was finished prior to 1826, as was the old Shepody road, and also the road from Shediac through Cocagne, Buctouche, Richibucto to Chatham (apparently marked out prior to 1827 as a part of a great road from Halifax to Quebec), while it was extended from the Miramichi to Bathurst somewhat later. Prior to 1830 a road was commenced from Fredericton directly to Grand Falls as a direct mail route to Canada, but only a few miles were ever finished. In 1833-1834 the New Brunswick and Nova Scotia Land Company road from near Cardigan to the Miramichi through Stanley was built. About this time a new road to St. Andrews (explored 1826, 1827) by way of Hanwell and passing west of Oromocto Lake was laid out. Later the Fredericton-Chipman road was built (but was not extended to Richibucto until after 1850), as was about the same time the Canaan-Moncton direct road, which was apparently intended to run directly to Chipman, forming a short road from Fredericton to Westmorland. After 1840 the Eel River-Oak Bay road, connecting with St. Stephen and St. Andrews, was finished, and a little later one from Prince William through Magundy and Magaguadavic Ridge, which was later extended down the Magaguadavic to the St. Andrews road. Many other roads, including some through the wildest parts of the Province, were projected, in some cases surveyed and even opened out (as in the road of 1839 from Nerepis to Red Rock), but they were later abandoned, though some of them are shown with great definiteness on older maps of the Province.

¹ A full description of these roads at the close of the period is in Johnston's Report, 2nd ed., 19.

The importance of these roads from our present point of view consisted in this, that many of the early settlements were located upon them. This had the double advantage of providing the settlers with roads ready built, and of providing the roads with settlers who would offer accommodations for travellers, keep them broken open during the snows of winter, and steadily work to improve them in summer. Communication was also improved in this period in another way, namely by the establishment of steamboat lines, not only to the United States and neighbouring provinces, but to St. Andrews and along the entire length of the St. John, from its mouth to Edmundston.¹ Indirectly these lines had an effect upon the distribution of settlements, since they made more distant parts of the St. John accessible, and hence allowed some of the new settlements to be formed some distance up its course. Plans were made to improve the navigation of the upper St. John in this period by the removal of various obstructions to navigation,² and plans were even considered for a canal connecting the waters of the St. Croix with those of the St. John,³ as well as for a canal across the Isthmus of Chignecto. But none of the canal plans, except for the small canal across the neck at Gagetown (recommended 1836, finished 1854), were carried to completion.

B. Sociological Factors.

These were practically identical with those of the preceding period, since the new settlers were in general of the same origins as the old. The large influx of immigration from Great Britain undoubtedly produced its effect in swinging New Brunswick institutions towards British, rather than American ideals. This, however, hardly has a bearing upon our present subject, though it must be taken into account in a study of the development of the New Brunswick people as a whole. Furthermore, in this period the racial character of the New Brunswick people was being influenced and altered by environmental conditions, a feature which became more pronounced in the next period. In this period certain new counties were established involving the selection of shire towns, with their adventitious advantages,—*Bathurst* for Gloucester, *Richibucto* for Kent, *Woodstock* for Carleton, *Grand Falls*,

¹ A good account of the steamboat navigation of the upper St. John is in Raymond's *Carleton County*, 87-89, and Baird's *Seventy Years*, 52.

² A survey of the river, with levels, from Fredericton to Grand Falls was made by Foulis in 1826, and a detailed report on the improvement of the river was made by Bent and Grant in 1850.

³ The Report by Bradbury is in an appendix to the journals of the House of Assembly for 1836-37.

and later, *Andover* for Victoria, *Dalhousie* for Restigouche and *Hope-well* for Albert.

C. Environmental Factors.

During this period the environmental factors were the same as in the preceding periods, with, however, two modifications. First, communication having been much improved, especially by the building of roads, it now became possible to form settlements away from the navigable waterways, and second, all of the best positions, and most of the best lands, having been preempted by the earlier settlers, it was necessary for the settlements of this period to be formed largely in less advantageous situations. Considered broadly the new settlements of this period occupied four kinds of situations.

First, they were formed on certain parts of the coast presenting fair lands, and not previously taken up. Such settlements were almost entirely those of the new immigrants, and they included *Mascareen* and *Lelang*, *Irishtown* (Pisarinco), the coast from Shemogue to Jourimain, including *Murray's Corners*, *Napan*, perhaps *Douglastown* and *Nelson*, *Pokemouche*, *New Bandon*, *Belledune*, and all of the Scotch settlements, thence along Bay Chaleur to Restigouche. Evidently the factor of accessibility was here strongly operative, and it is notable that these included many of the earliest settlements of the period. Of native settlements formed in this situation, the most important was that around *Meringuin* peninsula.

Second, they occupied lands on the principal rivers above the older settlements, and in such cases, with the exception of the *Military Settlements* along the St. John above Presquile, they included almost pure native expansion settlements, as on the *Digdeguash*, *Magaguadavic*, *Eel River*, both branches of the *Oromocto*, *Becaquimec*, *Tobique*, *Petitcodiac* and its branches, *Pollet River*, *Coverdale*, *Turtle Creek*, *Black* and *Bay du Vin Rivers*. In other cases these settlements consisted of mixed native settlers and immigrants, as on both branches of the *Nerepis*, on *Salmon River* (Queens), the *Richibucto*, and perhaps the other principal rivers of Kent, and the principal branches of the *Miramichi*, the *Northwest*, *Little Southwest*, *Renous*, *Barnabys*, *Bartholomeus* and the upper part of the Main South West, including *Hayesville* and *Campbell*. The only cases known to me of pure immigrant settlements in this situation are *Cains River* and the *Bartibog*, which appear to be entirely Irish above their lower courses.

Third, they occupied positions along the courses of the great roads, which gave access to new tracts of good lands, and which at the same time the settlements helped to keep open for travel. Thus were located *Military Settlements* on the great roads from Fredericton to Miramichi

and from Fredericton to St. Andrews, and also *Harvey, Hanwell, Brockway*, the *Scotch Settlement* in New Maryland, *Carlow, Western Scotch Settlement*, the *Londonderry* and *New Ireland Settlements* on the Shepody road, *Emigrant Settlement* on the old Quaco road, *Fredericton Road, Botsford Portage, Black River (Kent)*, and *New Gallo-way, Upper Bay du Vin*, and many of lesser consequence down to individual settlers scattered along the lines of the great roads.

Fourth, they occupied good tracts of lands, commonly ridges, on the back lands as near to the old settlements as good lands could be found, which was sometimes near and sometimes remote.¹ New roads were built to such places, which later often became extended through to connect with other roads, thus becoming through routes of travel. These settlements included both native expansion and immigrant settlements. Of the former the most important by far was the solid group of native settlements, including only a small Scotch and a small Irish settlement,² which filled up the good uplands of *Carleton County* west of the St. John river, and to some extent the eastern side, and a similar native settlement with some immigrant addition was *Howard Settlement*. Other native settlements of this character were *Lynnfield*, and small neighbouring settlements, *Whittier's Ridge, Victoria, Campbell* (Southampton), those on the uplands of Kings County, and those on the back lands of Albert and Westmorland. Of the immigrant settlements, the more important were *Baillie, Clarence Hill, Tryon, Flume Ridge, Newburg, Magundy, Blaney*, and *Magaguadavic Ridges*, with *Pokiok Settlement* and *Lake George, Cardigan, Tay*, those formed by the New Brunswick and Nova Scotia Land Company, *Hibernia, Lawfield, New Jerusalem, Clones, Enniskillen, Boyne, Patterson, Ballyshan-non, East Scotch Settlement, English Settlement, Irish Settlement*,

¹ The following passage from Johnston's *North America* (II, 171) expresses the origin no doubt of many of these native settlements of this character. He is speaking of Harvey settlement in York County.

"Behind the second tier of farms are extensive caribou plains and pine swamps as far as the Magadavic Lake; but, exploring in search of good land, the young pioneers of the settlement have discovered a tract of rich hardwood land in the midst of the wilderness beyond this lake, to which there is at present no access for want of roads, and no facility of settlement, because of its present remoteness from all human habitations. It is by such explorations, the results of natural expansion, that the better lands are discovered, and the means of successful extension afforded to the families of the older settlers."

The next step in such a case as this would be for the young settlers to apply to the Government for the land, and for aid to build a road to it. The land would then be surveyed, a road built (if not too distant), the lands would be allotted, and a new settlement would arise.

² Also apparently some English immigrants at *Plymouth* and *Ivys Corner* and some Americans at *Parks Hill* and elsewhere.

Shannon, Henderson, Waterloo, Irishtown (Westmorland), *New Scotland, Emigrant Settlement*, and a few others of lesser importance, while the immigrant expansion settlements of the period had this situation also. It is notable that the back-land immigrant settlements of this period are very largely in the southern part of the province, in the vicinity of the navigable waters of Passamaquoddy Bay and the lower St. John and its branches, while practically none were anywhere on the North Shore, a fact showing that the factor of accessibility was still powerfully operative.

During this period lumber continued to form the great staple of New Brunswick export, and the lumber trade of the province, with shipbuilding, rose to its culmination. The centre of the trade, however, shifted gradually during the period from the Passamaquoddy region, in which the best of it had been exhausted from the smaller rivers, to the St. John, and especially to the North Shore, where, after the introduction of steam mills (about 1825) an immense development on the Richibucto, Miramichi and Restigouche took place, temporarily checked on the Miramichi by the great fire in 1825. It was under the stimulus of this trade that *St. Stephen, St. George* and *St. John* rose greatly in importance and also *Fredericton, Woodstock, Andover*, while *Edmundston, Richibucto, Chatham, Newcastle, Bathurst, Dalhousie* and *Campbellton* rose into places of considerable importance. In this period the water powers became more fully developed, and in Charlotte, not only St. Stephen, Milltown and St. George thus became important, but *St. Patrick, New River* and *Lepreau*, now decadent, were of some consequence, while along the St. John many water powers became utilized for lumbering purposes, especially those at *Blake's Mills* (Marysville), *Coak, Pokiok*, and elsewhere, and attempts were made to utilize Grand Falls and the Red Rapids of Tobique. The introduction of large steam mills, however, at or near the shipping places for lumber, combined with its exhaustion on those rivers with the larger water powers, gradually combined to render these of diminishing value.¹

The other environmental factors continued to promote the older settlements, but hardly formed any new ones in this period. The free-stone trade with the United States gradually developed villages at *St. Mary's Point*, places on *Meringuin, Rockland*, and elsewhere, now mostly abandoned, though the export of gypsum still continues at *Hillsborough*, adding much to the importance of that place. There was a steady development of the fishing centres, and the trading or distributing centres, mostly coincident with the lumbering centres, con-

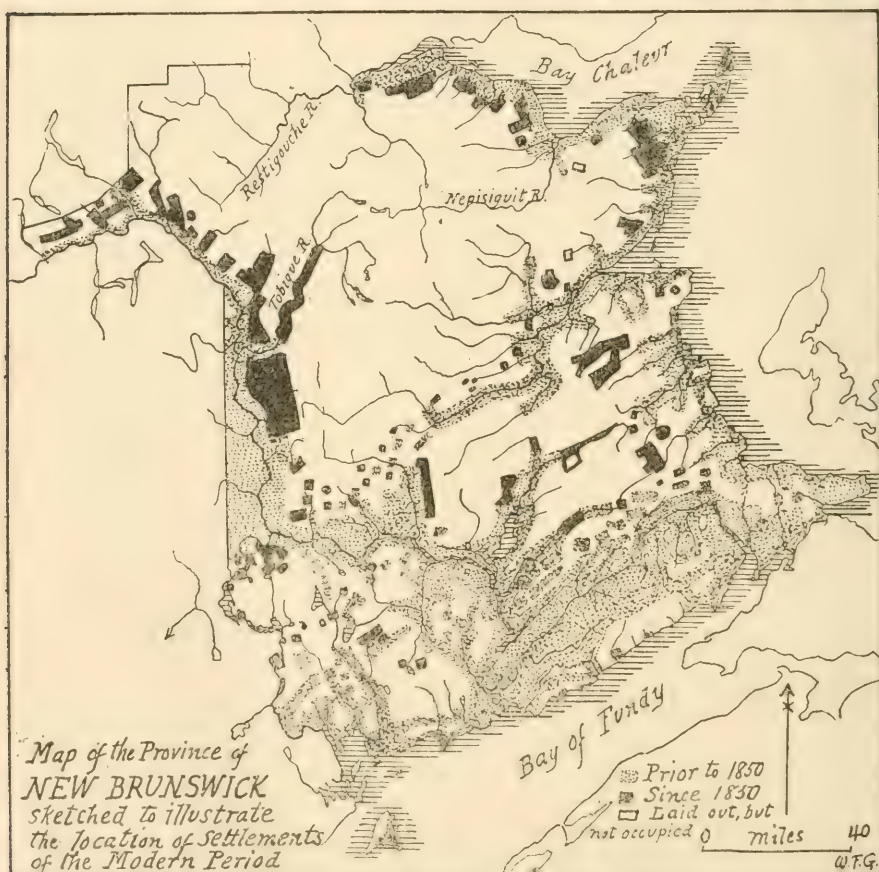
¹ A valuable work on the lumber trade in New Brunswick, with a few notes on its history, is contained in "The Wood Industries of Canada," London, The Timber Trades Journal, 1897.

tinued to grow steadily, while new trading centres arose at *Port Elgin*, the *Bend* (now the City of Moncton) and *Sackville* became important.

Reviewing this period in general, it is plain that it was not only one of active expansion in settlement and population, but the most prosperous in both respects that the province has yet known, and it established the greater number of the settlements in existence to-day.

7. THE MODERN PERIOD (1850 TO THE PRESENT).

There is no distinct division between the preceding and the present period. In general, the transition is marked by the beginning of rail-



MAP NO. 12.

way building, and by the inauguration of the system of granting lands practically free to desirable settlers, which events fall approximately about the year 1850. The period is marked also by the great decline

in European immigration, which did not manifest itself, however, until about 1861, and by the beginning of an extensive native emigration or "exodus," which commenced somewhat later. The new settlements of the period are not numerous. They are located approximately on the accompanying map (No. 12), and were determined as described below. The final distribution of the population is illustrated upon map No. 13.

A. Historical Factors.

a. *The check in New Brunswick's growth through extrinsic causes.*

An important feature of this period is the check in the growth of population, especially in later years. This is clearly brought out by the accompanying tables and curves (polygons). The five southern counties (shown in the lower part of figure 14),¹ whose boundaries remain substantially as at the foundation of the province, show clearly this check after 1861, and a loss of population, connected with the native exodus, after 1881. The conditions in the other counties are less easy to trace, owing to their subdivision at different times into new counties, but this being allowed for, two facts are evident, *first*, the check in their population is less marked, and, upon the whole, is later in appearing than in the southern counties, and, *second*, in those with a large French element there is no check at all, but a steady increase. The province owes it entirely to the French that it has not fallen off in population in recent years. The tables and curves show that the five southern counties had their most active growth in the preceding period (prior to 1851), while the northern and eastern counties have had their most active growth since then. The curve for the entire province shows clearly the beginning of the check in 1861, and its culmination after 1881.²

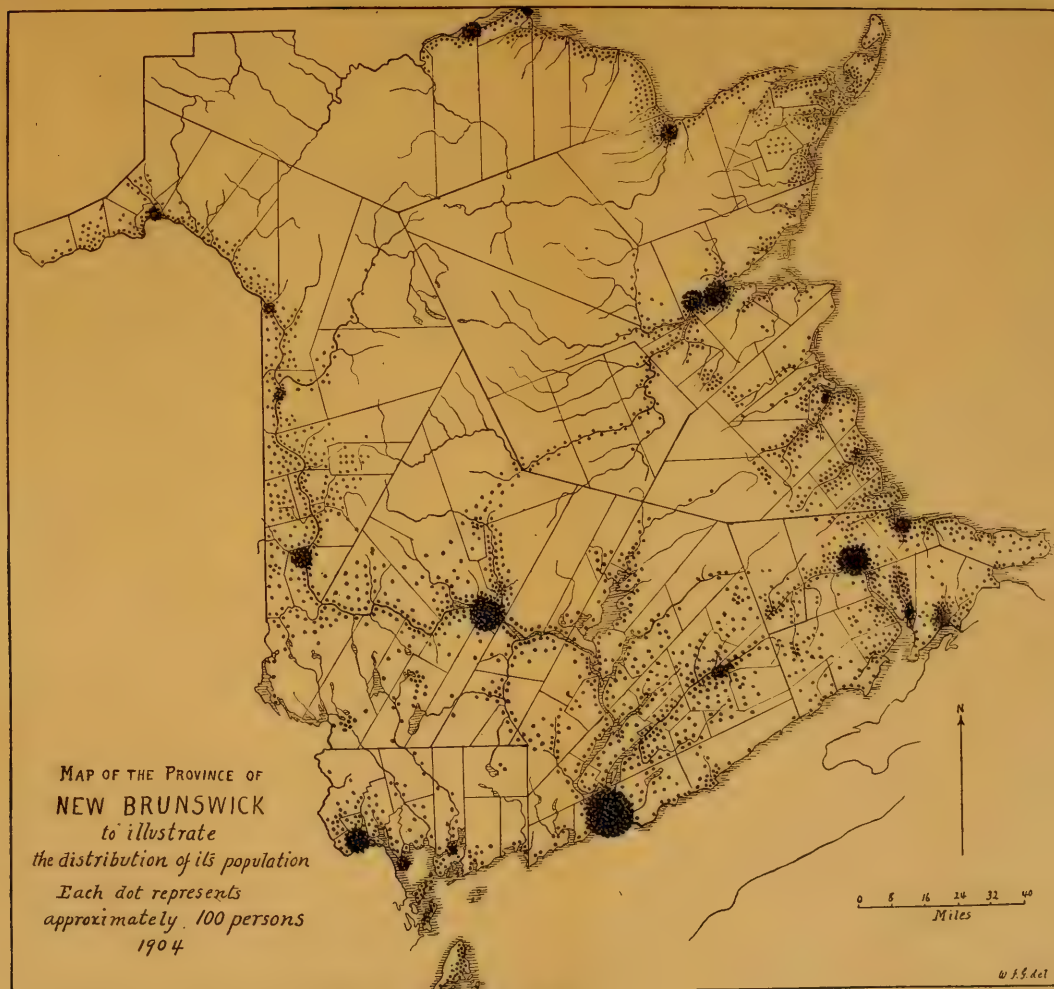
¹ In this figure each vertical space represents 1,000 of population, except in the curve for the province, where each represents 2,500. The marginal letters are initials of the counties and province. The forking of the upper curves shows the formation of new counties at the respective dates. Certain lines are dotted simply to avoid confusion with lines they cross.

² No statistical study of the New Brunswick population and its movements has yet been made, though the subject is most inviting, and essential to a correct understanding of the province's history. The first census of the province was taken in 1824, and later censuses in the years shown by the accompanying tables. For the years prior to 1824 we have only certain approximations. Thus Wedderburn, in his "Observations" (page 54), and elsewhere, estimates the population as 12,000 in 1782 (11,457 in 1783, on page 74), and as 27,000 in 1803. The latter figure is, no doubt, based on data collected in that year by Edward Winslow for Governor Carleton, as recorded in the *Winslow Papers*. The estimate for 1783 is, no doubt, based on the returns of disbanded troops and Loyalists for that year or the next (Canadian Archives, 1884, xli.; these Transactions, V., 1889, ii. 151), but the estimate would appear too small, as there must have

The causes of this check in the growth of the English-speaking population are perfectly well known. They consist not in the absolute lessening or exhaustion of New Brunswick's natural attractions, but in the great relative increase of attractions elsewhere, especially the

	1824	1834	1840	1851	1861	1871	1881	1891	1901
Province.....	74,176	119,457	156,162	193,800	252,017	285,394	321,233	321,263	331,120
Charlotte	9,267	15,852	18,178	19,038	23,063	25,882	26,087	23,752	22,415
St. John	12,907	20,608	32,957	38,475	48,922	52,120	52,906	49,574	51,759
Kings.....	7,930	12,195	14,464	18,842	23,283	24,593	25,617	23,087	21,655
Queens	4,741	7,204	8,232	10,634	13,359	13,847	14,017	12,152	11,168
Sunbury	3,227	3,898	4,260	5,301	6,057	6,824	6,651	5,762	5,738
York	10,972	10,478	13,995	17,628	23,393	27,140	30,397	30,979	31,620
Carleton ...	....	9,493	13,381	11,108	16,373	19,638	23,365	22,529	21,621
Victoria .....	....	....	....	5,408	7,701	11,641	8,676	7,705	8,825
Madawaska .....	....	....	....	....	....	....	7,010	10,512	12,311
Westmorland	9,303	14,205	17,686	17,814	25,247	29,335	37,719	41,477	42,060
Albert .....	....	....	....	6,313	9,444	10,672	12,329	10,971	10,925
Northumberland	15,829	14,170	14,620	15,064	18,801	20,116	25,109	25,713	28,543
Kent.....	....	6,031	7,477	11,410	15,954	19,101	22,618	23,845	23,958
Gloucester .....	....	8,323	7,751	11,704	15,076	18,810	21,614	24,867	27,936
Restigouche .....	....	....	3,161	4,161	4,874	5,575	7,058	8,308	10,586

been that many Loyalists in the province, while Acadians and old inhabitants would certainly add nearly two thousand more, not to mention Indians. Some data exist for an estimate of the population in 1767, in a general return of the Townships of Nova Scotia in that year (these Transactions, above cited, 138). This gives 929 inhabitants to the New Brunswick townships, not counting New Brunswick's share of Cumberland (334), and of a miscellaneous division including Miramichi, the St. John River and Cape Sable (172), of which probably half, say 253, belong to New Brunswick, making in all 1,082 inhabitants. These figures do not include by any means all of the Indians or Acadians, but only those happening to reside in the townships.



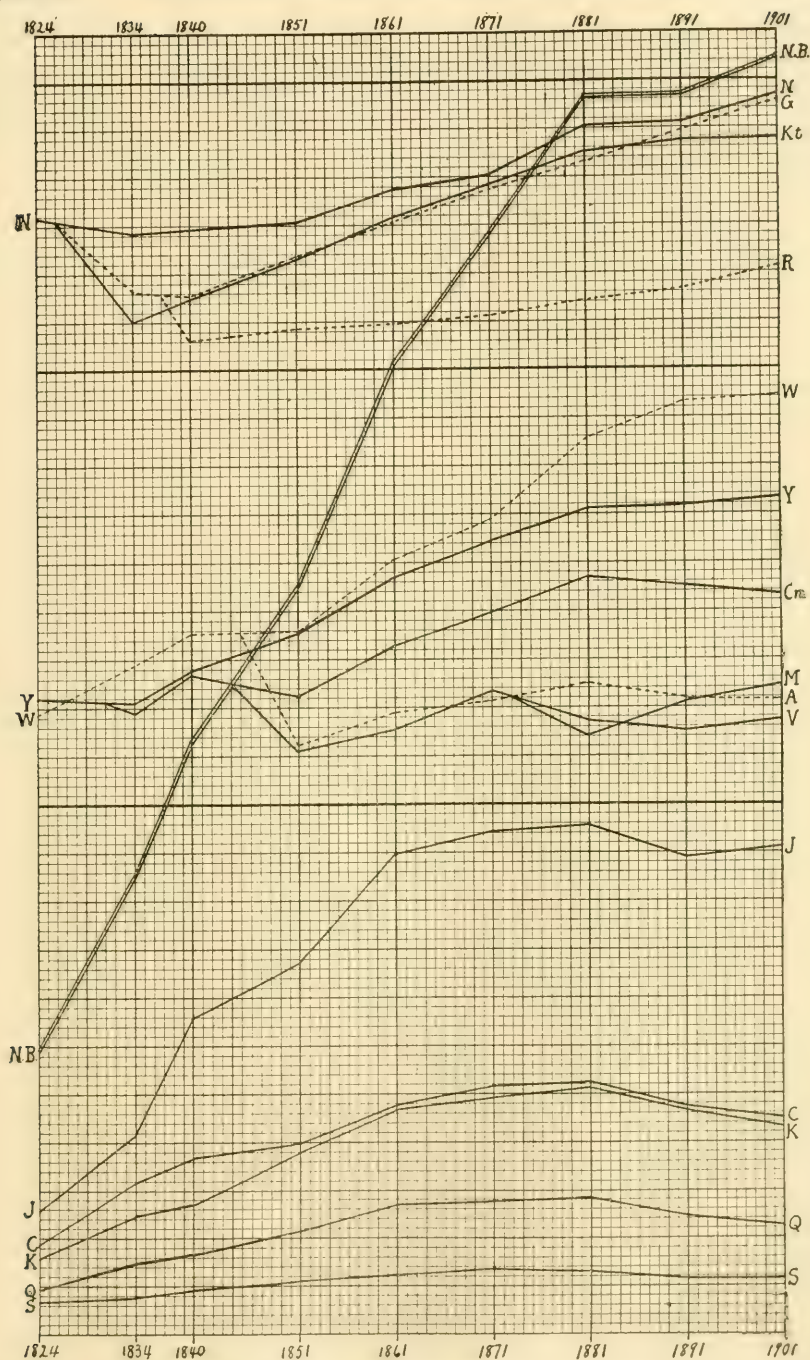


FIG. 14. CURVES OF INCREASE OF POPULATION.
Sec. II., 1904. 7.

prairie lands of the west and the great cities of the United States. The former have attracted European immigrants who otherwise would have settled in New Brunswick, while the latter have drawn away a large part of the progressive, or restless, youth of the province. This has shown its effects in settlement, causing the latter to be much less than it otherwise, or normally, would be.

b. *Continued but lessening European immigration.* The opening of the period found immigration from Great Britain and Ireland still active, but beginning to lessen. This is brought out clearly by the comparison of the following figures with corresponding tables given earlier. They are from the Appendix to the Journals of the House of Assembly for 1860-1, and they represent the official returns of the entire immigration to the province in these years:—

1851..	3,470	1856..	708
1852..	2,165	1857..	607
1853..	3,762	1858..	390
1854..	3,440	1859..	230
1855..	1,539		

From this time to the present, with some fluctuations, immigration has continued small, and, as a whole, it has continued to decrease. As before, most of the new settlers were Irish,¹ and distributed themselves among the older settlements, and there appear to be very few new immigrant settlements founded between 1850 and 1870. *Kitchen Settlement, Marr Settlement, Emigrant Settlement* (Sunbury), *New Scotland, Ennishone*, apparently belong to this period, as do some of the settlements of the New Brunswick and Nova Scotia Land Company. In the next decade, however, the Government put forward special efforts to attract immigration, sending special commissioners abroad and providing very liberally, at great expense, for new immigrants.² In this way the colonies of Danes in the *Danish Settlement*, and of Scotch in *Kintore, Stonehaven, Glassville*, and of English from near Bristol in *Balmoral*, were introduced, originating these settlements, all but the last of which are thriving. These represent the latest important immigrant settlements formed in New Brunswick.

Another form of European immigration in this period was the arrival of large numbers of workmen (chiefly from Ireland), to work on the construction of the new railroads, and many of them settled in the province. Thus, in 1848, as already noted, 200 Irish

¹ On the relative value of Scotch and Irish as settlers, see Ward in the Blue-book Emigration Report for 1843, page 37.

² In a valuable "Report on Mr. Brown's Mission to Great Britain and Ireland for the promotion of Emigration to New Brunswick" (Fredericton, 1863), it is stated that New Brunswick did not pay the passage money of emigrants as other colonies did, but apparently this was done later.

workmen were sent out from his Irish estates at Wicklow, by Earl Fitz-William, to work on the St. Andrews and Quebec railway, and many of these afterwards settled along the line of that road, especially at St. Andrews, and in and near Canterbury.¹ In general these workmen formed no settlements by themselves, but settled singly, or in small groups, in or near the older settlements, or in those newly-forming. One such group, of Shetlanders, settled in Tilley at the present *Lerwick*, while others settled in various of the new stations along the lines.

c. Sporadic American immigration. During this period there has been some scattered immigration from the United States, and, as before, it has mostly been connected with lumbering. Thus, *Salmonhurst* on Salmon River, *Sheila* at Tracadie, and others, have been recently founded. A more distinctive form of American immigration, however, consisted in the settlement in the province of a number of American citizens who fled from the United States in 1863 or 1864, to escape the draft into the Union armies. Such men were commonly known as "skedaddlers" and they settled at numerous points in New Brunswick, at *Skedaddle Ridge* (or Golden Ridge, near Knowlesville), and *Golden Ridge*, near Monument Settlement, at *Parent Ridge*, in York, at a locality called American Lodge on the Restigouche, and elsewhere. Many of these returned to the United States after the close of the war, but others remained as permanent settlers.

d. Native expansion. In the earlier part of this period the native population continued to expand actively, forming many important settlements. The rate of expansion and number of settlements have, of course, fallen off in recent years, with the check in the growth of population. As before, much of the native expansion has consisted in consolidation and extension of the boundaries of earlier settlements, and later, a good deal has been taken up by the various towns and villages which have grown up along the railway lines, and by the movement, universally characteristic of the times, towards the cities. A number of distinct settlements have been, however, formed. Those of English-speaking settlers were the following:—*Peltoma*, *Brown's Ridge*, *Oak Ridge*, *Ferriebank*, *Clarendon*, *Wooler Settlement*, *Harvey Mills*, *Graham's Corner*, *Monument Settlement*, *Pokawagamis*, *Hartin*, and others in that vicinity of Eel River, *Alma*, *Nortondale*, *Nacawic*, *Howland Ridge*, *Maple Ridge*, *Parent Ridge*, *South Newbridge*, *Waterville*, *Temperance Vale*, *Cloverdale*, *New Carlisle*, *Johnville*, *Chapmanville*, *Beaufort*, *Canaan* (Carleton), *Red Rapids*, *Sisson Ridge*, *Arthuret*, and

¹ In 1853, 300 English, 6 Scotch, and 6 Irish workmen were brought out on the "Imperial" by King, the contractor, to work on this railroad, and most of them no doubt settled in the province. (Information from one of the workmen.)

the *Tobique* to the Forks, *Tilley*, *Glencoe*, *Union Settlement*, *Williamsburg*, *Gordonvale*, *Pleasant Ridge*, *Taxis River*, *Thornbrook*, *Cherryvale*, *Centre Village*, *Colebrookdale*, *Pleasant Ridge*, *Protectionville* (*Sugary*) *Sunnyside*, *Lorne*, *Mitchell*, and some others. The native (Loyalist and New England) expansion, which, in the preceding period had filled so much of the best uplands of Carleton, here filled up the lands along Eel River and west of the Nacawic, and especially expanded up the *Tobique*, which is peopled by an almost pure native population, as fine a people as any country district in America possesses.

A most important phase of native expansion in this period is that of the Acadians. In Madawaska they have expanded to the back lands forming *Chambord*, *Commeau Ridge*, *Coombes Road*, *Newfoundland Settlement*, *Grand River*, *Quisibis*, *Plourde*, *Patrieville*, *Riceville*, *Baker Lake*, *Long Settlement* and others in that county. In Westmorland they have consolidated and extended their old settlements, especially in the vicinity of *Cap Pelée*, and they have filled up the back lands of Kent in the parishes of *St. Mary's* and *St. Paul's* including *Trafalgar*, *Bishop's Land*, *Louisburg*, and other places in that vicinity. They have also settled *Adamsville*, *Acadieville*, *Rogerville* and *Collet Settlement*, all very important settlements, and have expanded along the coast between Kouchibouguac and Cape Sapin, and they are settling *Eel River*, *Fair Isle* and *St. Joseph*. In Gloucester they have expanded to *St. Isidore*, *Pacquetville*, *Millville*, *Robertville*, and have filled in gaps between other settlements in that region, and on *Shippegan* and *Miscou*, and to some extent they are settling in the new settlements of Restigouche, especially in *Colebrooke*, though these are largely Canadian French from Gaspé. The many Acadians settling in Campbellton and vicinity are either Canadian French from Gaspé or an expansion of the Acadian settlement at Metapedia formed in 1861 by Acadians who removed there from Prince Edward Island. Many of the settlements here mentioned are but thinly occupied, and are still in a state of formation. Furthermore, they are superseding the English-speaking settlers in various parts of the province, taking up the farms of the latter as they remove from the province, and occupying the various vacant lots in sundry English settlements, a process which is going on extensively in Kent particularly, but also in Madawaska and to some extent in Restigouche.

Another form of native expansion is that from Nova Scotia to this province, and in this period the settlements of *Knowlesville* (an association from Yarmouth), *Kentville* and *Lumsden* were thus formed, while many Nova Scotian settlers have taken up lands in various other new settlements.

*e. The labour and free grant settlements.*¹ Prior to 1849 all lands granted by the province to settlers had to be paid for in cash, though easy terms of payment were given to immigrants and other actual settlers. In that year, however, an Act called the "Labour Act," was passed by the local legislature, which allowed new settlers to pay for their lands by labour on the roads in and near their settlements. During the next few years a number of tracts were laid out in different parts of the province and settled under this Act. Somewhat later, in 1856, another plan was tried, apparently at the suggestion of H. M. Perley, by which large blocks of land, each having a distinctive name, were laid out for sale by auction to new settlers. The blocks laid out upon this plan in that year were those of *Peltoma*, *Clarendon*, *Tobique*, *Connell*, *Campbell*, *Bayfield*, *Blackwood*, *Monteagle*, *Trafalgar*, *Breadalbane*, *Medisco* and *Balmoral*, all of which are shown upon Wilkinson's, and some other maps of the time. The plan, however, did not prove popular, and only a few lots were taken up, so that these blocks were soon after merged into those which could be taken up under the Labour Act, and in this way most of them were partially settled, while some others (*Breadalbane* and *Bayfield*) have not been settled to this day.

¹ The publications connected with immigration in this period that I have found are the following:—In 1857 was published H. M. Perley's excellent little "Handbook of Information for Intending Emigrants to New Brunswick." In December, 1859, the Mechanics' Institute of St. John offered two prizes (of 15 and 10 guineas) for the best essays upon "New Brunswick as a Home for Emigrants; with the best means of promoting Immigration, and developing the resources of the Province." The first prize was won by J. V. (now Senator) Ellis, the second by James Edgar; the third in merit was by Hon. James Brown, the fourth by William Till and the fifth by W. R. N. Burtis, all of them excellent essays. They were all published in St. John in 1860, and large numbers of them appear to have been distributed. In 1861 Hon. James Brown was sent to Great Britain to represent the advantages of New Brunswick as a home for emigrants, and his interesting Report was published in 1863. In 1870 was published an excellent pamphlet, "Facts for the Information of Intending Emigrants about the Province of New Brunswick," by Samuel Watts. At least three Reports of Immigration to New Brunswick, 1872-73-74, by the then Surveyor-General B. R. Stevenson, were published, giving full histories of the Danish, Kintore and Stonehaven settlements, and mentioning emigration pamphlets widely distributed in Great Britain. In 1879 appeared a valuable handbook entitled "Province of New Brunswick, Information for Intending Settlers," by the Surveyor-General, Michael Adams, particularly important for its account of the Labour Act and Free Grants Settlements. Another excellent handbook was Lugin's "New Brunswick," 1886. A later handbook, by Hickman, "Handbook of New Brunswick," 1900, and Hannay's excellent "Province of New Brunswick," 1902, complete the list. Further information about these works may be found in the Bibliography. Much information on the subject is also scattered through the Journals of the House of Assembly.

The Labour Act proved, upon the whole, a success, and many new settlements were laid out under its provisions. Thus, between 1858 and 1861 the following new tracts were surveyed and thrown open for settlement:— *Johnville*, *Knowlesville*, *Glassville*, the tracts occupied by *Alma*, *Durham* and *Glencoe* (Wesleyan Tract), the tracts occupied by *Emigrant Settlement* and *Hardwood Ridge* in Sunbury, *Red Bank* and the *North Branch Salmon Creek* settlements in Queens. *Ferriebank* (west of South Oromocto Lake), *Lumsden*, *St. Louisa*, and some others which were not settled.

A number of these tracts were taken up by large associations mostly organized upon a religious basis. This movement appears to have had its origin in the reference to the advantage settlers derive from combining together in their applications for land made by the Lieutenant-Governor, Hon. J. H. T. Manners-Sutton, in his speech at the opening of the legislature in January, 1860, and the cordial assent thereto of the legislature in their reply.¹ His suggestion was at once adopted. Bishop John Sweeney, of St. John, organized a Roman Catholic association in St. John, and thus settled *Johnville*, which later expanded to *Chapmanville*, while another association of Acadians settled a tract in Kent, now called *Bishopsland*, or *St. Paul*. A free Baptist association (from Yarmouth, Nova Scotia), under the leadership of Rev. Mr. Knowles settled *Knowlesville*, and another of the same denomination from St. John, under Rev. Mr. Ferrie, appears to have made an attempt, but with little success, to settle *Ferriebank*, near South Oromocto Lake, while an association of Scotch Presbyterians, mostly from Scotland, under the auspices of Rev. Mr. Glass, settled *Glassville*. But this movement soon expended itself, and apparently no later settlements were formed in this way, excepting, of course, the Acadian settlements, which have always been organized, more or less, upon this basis.

During the next few years a number of new settlements were laid out under the Labour Act, and most of the new settlements, both of immigrants and native settlers, were made under its provisions down to 1872. In that year the government, doubtless under the influence of rapidly lessening immigration and increasing native exodus, passed the "Free Grants Act," whereby lands are granted free to actual settlers applying for their lands in groups. Many unoccupied parts of earlier blocks were included among the Free Grants settlements, and other new blocks were laid out, until, in 1879, the following were announced as Free Grants tracts: *Beaconsfield*, *Canoose*, *Riceville*, *Plourde*, *Quisibis*, *Coombes Road*, *Commeau Ridge*, *Patrieville*, *Salmon River*, *Sisson*

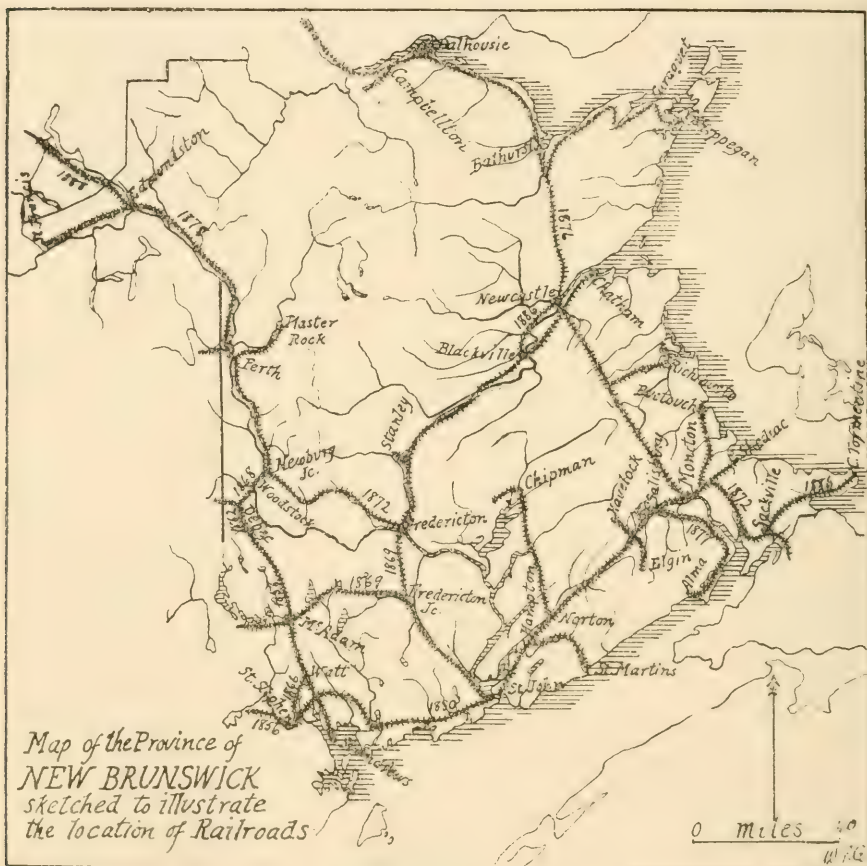
¹ In the Select Committee Report of 1861 it is stated (page 45) that the whole Association scheme grew out of this reference in the speech and the reply.

Ridge, Red Rapids, Tilley, New Denmark, Stonehaven, Kintore, Beaufort, Chapmanville, Cloverdale, Acadieville, Colebrookdale, Adamsville, Rogerville with Collet Settlement and Pleasant Ridge, Sugary (Protectionville), Pleasant Ridge, St. Joseph, Warwick, Hazelton, Eel River, Lockstead, Robertville, Millville, Clearwater, Paquetville, St. Isidore, Mitchell, Lorne, Sunnyside, Balmoral and Colebrooke. Since 1880 a few others have been added,—*Whitehead, Baker Lake, Long Settlement, Trout Brook, Martin, Michaud, Blue Mountain, Gallagher Ridge, Dunnville, Barnesville, Johnsonville, Richard, Young, St. Rose, Springfield, St. Charles, Elm Tree River, Dawsonvale*, together with extensions of several of the older settlements. To-day these are slowly filling with settlers, almost entirely natives of New Brunswick, and largely Acadians.

f. The building of railways. The present period is marked off distinctly from the earlier by the beginning of railway construction. The great highways of the Province had been completed in the preceding period, and between 1840 and 1850 railways were greatly discussed in the Province and elsewhere; but it was not until 1847 that the first sod was turned for a railway in New Brunswick, and not until 1851 that railway construction was actually commenced. Thenceforward, however, railroad planning, surveying and construction have gone on well-nigh continuously to the present, to such an extent that it is commonly affirmed in the Province that New Brunswick has more miles of railroad, in proportion to its population, than any other country of the world.

The first railroad planned in the Province was one from St. Andrews to Quebec, which, first discussed in 1835, was actually commenced in 1851, and with many vicissitudes was pushed as far as Canterbury in 1858, and to its temporary terminus at Richmond in 1862, while connection was made with St. Stephen in 1866, with Woodstock in 1868, and with Houlton somewhat later. The next road built in the Province was that from St. John to Shediac, which, commenced in 1858, was finished in 1860. Later this was extended westward (the Western Extension) to connect with the Maine system, reaching McAdam and connecting with Fredericton in 1869, and with Vanceboro somewhat later; and about the same time the Eastern Extension, from the Painssee to the Nova Scotia boundary was commenced, and was completed in 1872. In the meantime, however, after prolonged discussion and many delays, the Intercolonial was commenced (1867), and in 1872 communication was established between St. John and Halifax, and in 1876 with the St. Lawrence. During this time also (1870) the Quebec and New Brunswick Railway, intended to run from Fredericton (Gibson) up the Keswick, the St. John valley, and by Temiscouata to River du Loup, was projected; it was commenced in 1872, and in 1876 completed to Edmundston, the connection with River du Loup being made much

later by another company. Thus were the great trunk lines of the Province finished. Since then many minor lines and side branches have been constructed as shown by the accompanying map (No. 15). In general it may be said that the main lines have fully justified their construction, even though they have not realized the advantages originally expected. Of the many side lines, not so much can be said, and the



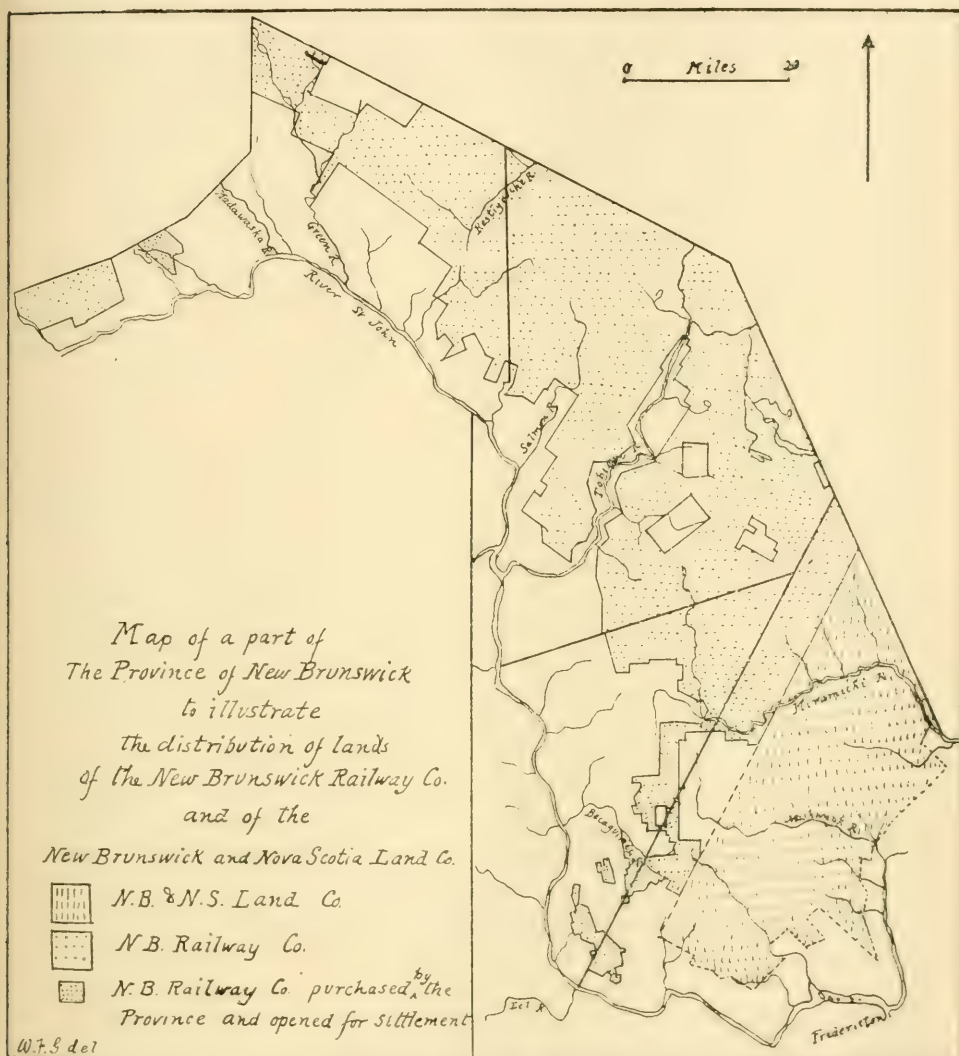
MAP No. 15.

history of some of them is neither a credit to the character of those who promoted them, nor to the intelligence of the Legislature which has encouraged them.¹

The construction of these railroads has had a most important influence upon the distribution of settlement in the Province, and in three

¹ The history of the building of the railroads in New Brunswick, as a whole, has not yet been written, though the subject is a most inviting one. There is an admirable and very complete history of the Intercolonial, by Sir Sandford Fleming (see Bibliography), and a very good history of the St. Andrews and

ways. First, it has led to a movement of population towards them. and the growth of a great number of railway stations which have become centres of considerable business and population, and to the marked growth



MAP No. 16.

of the towns through which they pass. Second, certain new settlements have been established along the lines of the railways. This has

Quebec Railroad, from its inception in 1835 down to 1869, published anonymously in 1869. For the rest, there are a great number of prospectuses, reports of surveys, documents in the Journals of the House of Assembly, Reports of the Railway Commissioners of the Province (from 1858 to 1872) and other material.

been especially the case with the Intercolonial, which does not, like most of the other roads, follow river valleys already settled, but cuts across the intervening ridges between them, and on these the settlements of *Adamsville*, *Girouard*, *Rhomboid*, *Dunnville*, *Acadieville*, *Roger-rille*, and some of lesser importance, have been established. *Third*, the intersections of these lines have established junctions, entailing settlement where it would otherwise not occur. In the case of the junctions of the greater lines, especially where the intersecting lines have come under a single management, the central repair shops, offices, etc., have become established there, greatly increasing the population, and to this *Moncton* owes most of its size and importance, and *McAdam* its very existence, for the latter happens to fall in a spot in which no settlement whatever would exist apart from the railroad junction.

In another way railroad construction has had an important influence upon settlement in this Province, namely through the granting of great tracts of land as railway subsidies. Some tracts, in western York County, were thus granted the St. Andrews and Quebec Railroad, but the most important of these grants by far, were those made to the Quebec and New Brunswick Railway (later the New Brunswick, and now the Canadian Pacific), which received 10,000 acres per mile of road constructed, of some of the most valuable lands of the Province, in the Counties of Carleton, Victoria and Madawaska, constituting the greater part of the two latter counties. The limits of these great grants, made at intervals between 1873 and 1879, are shown upon the accompanying map (No. 16). Now, the company has found it most profitable to keep its lands in a wilderness state, deriving its revenue from the sale of timber; and consequently little or none of these lands have been settled, and they act as a preventive of the expansion of the settlements in their vicinity. This has caused so much discontent, that, in 1902, the government proposed to buy back these lands to throw them open for settlement, but so far no agreement has been reached except in the case of a small tract in Madawaska, which, in 1903, was purchased by the Province from the railroad company and thrown open for settlement.

B. Sociological Factors.

These factors in general were as in the preceding period. The New Brunswick people have, however, been now so long in the country that there has been time for the environment to affect their racial character. The consideration of this very important and interesting subject, however, does not belong here, and I hope later to treat it elsewhere. A single new shire town was established in this period, *Edmundston* for Madawaska.

C. Environmental Factors.

These have remained practically unchanged from the preceding periods to the present, and hence need no special consideration here. The lumber trade has continued the greatest industry outside of agriculture, with the fisheries second, and no new industries of importance have arisen, nor have any new mineral deposits of importance been discovered. At the opening of the period all of the good lands on the sea-coasts and the principal rivers had been taken up, and the new settlements have had to be formed on the backlands. Further, the good backlands having for the most part already been taken up in the more accessible southern part of the Province, the new settlements, as our Map No. 12 shows, have been formed for the most part in the vicinity of the North Shore and of the Upper St. John, a fact correlated with the growth of population in the northern and eastern counties during this period. The present condition of settlement is approximately represented by the Map No. 12, although this does not bring out the continuous settlement along many of the high roads, nor the filling in between the older settlements which has occurred in this period. Nevertheless, in a general way, it represents correctly the proportions of settled and unsettled land. It will be noted that there exist in the Province some four unsettled areas. *First*, there is a small area in St. John and Albert, along the Bay of Fundy; this is a rocky plateau not profitable for cultivation. *Second*, there is a very irregular area in the south-western part of New Brunswick, included largely in the rocky Southern Highlands; this contains but little land capable of cultivation which is not already cultivated, and little expansion of settlement in this area is likely. *Third*, there is a great area in east central New Brunswick, which is in part vacant because of its boggy or sterile character, and in part because settlement has not yet reached its interior parts. *Fourth*, there is the great northern wilderness occupying all the north central and north-western part of the Province, extending into Quebec. All the central part of this area, including the Central Highlands, is not capable of profitable cultivation. But its north-western part, beyond the Tobique and Upsalquitch, is good land. That it is not occupied is due to three causes: (1) its most accessible part is held by the New Brunswick Railway Company, which does not permit settlement; (2) its interior parts through their remoteness and difficulty of access have not yet been reached; (3) the country is mostly so elevated that under this latitude it suffers from early and late frosts, which will greatly impede its settlement.

The most recent developments in settlement in the Province are connected with the efforts to open mines¹ in some parts of the Province, notably *Newcastle* (Grand Lake), where a company promises to bring many settlers, and *Beersville*, in Kent, to which a number of Belgian miners have been brought. Again, the increasing attractiveness to Americans of the Province's natural scenery, fine summer climate, and game supply, is adding to the prosperity of certain settlements, notably *St. Andrews*, *Campobello*, and the *Tobique Valley*, even if it is not creating any new ones. Further, the completion of the Canadian Pacific line across Maine, and the determination of the people of Canada to keep their export traffic within their own territory, has led to the development and expansion of St. John as a winter port, a position it holds only by virtue of the existence of an artificial political boundary across the continent. Within a few years past the Government has made renewed efforts to attract immigration, especially by sending a lecturer to Great Britain to represent the advantages of the Province, but the few new settlers who have come have scattered themselves in the settled parts of the Province.

8. THE PROSPECTS FOR THE FUTURE.

We have traced somewhat fully the origin of the present settlement of New Brunswick; it will be profitable to glance at the promise of the future. In the first place, it seems very certain that the check in New Brunswick's growth is but temporary. In time, the fertile areas of the west will be taken up, and then the expansion of the people of Europe will again seek an outlet in New Brunswick. The filling of the fertile prairies of the west must be followed by a rise in value of agricultural lands elsewhere, and those of New Brunswick will again see the day when they will not be offered free to all comers with few acceptances. Settlement will then not only expand into the northern parts of the Province, but many areas now unprofitable in the southern and central parts will, under a more careful and scientific system of cultivation, become profitable, and even valuable. Further, with the inevitable exhaustion of the timber in the United States, New Brunswick's forests will rise in value, and the many areas incapable of other cultivation will be devoted to the raising of forests and their products under an economic system. The coal supply of the world must, in time, diminish and rise in price under the demands upon it, and this will again bring

¹ Temporary mining operations have given some local stimulus, now removed, to a few places; as manganese to *Markhamville*, iron to *Jacksontown*, antimony to *Prince William*, etc. The valuable freestone quarries have been rendered useless by hostile tariffs of the United States.

natural sources of power into value, not only rendering New Brunswick's innumerable water-falls available, but especially the immense tides of the southern coast. I have no doubt that the enormous power developed by these tides will some day, and before long, be utilized, and that many prosperous manufacturing settlements will arise along our southern coast from Passamaquoddy to Chignecto, while some of the world's greatest manufactories may yet arise there. The settlements of the future in the Province of New Brunswick will centre in her good lands, in her chief water-powers, river and tidal, and in the outlets of her lumber trade.

Part III.—A SYNOPSIS OF THE ORIGINS OF THE INDIVIDUAL SETTLEMENTS OF NEW BRUNSWICK ALPHABETICALLY ARRANGED, WITH REFERENCES TO THE SOURCES OF THEIR HISTORY.

In the following List I have aimed to give for every settlement, past and present, in New Brunswick, a statement of the leading facts in their origin, and references to the various printed works in which their history is considered. But the work, in fact, falls far short of this ideal, partly because of practical limitations in its execution, and partly because for very many settlements, no printed or other records appear to exist, and I have been unable to obtain reliable information about them from other sources. But it is a beginning, and a foundation for further study.

In many cases it has been difficult to decide which name should be adopted for places which have more than one, since the names of settlements, of their post-offices and of their school districts, are much confused. In such cases I have usually chosen the local name for the settlement itself where it has one, and have treated it under its parish where it has not, and I have only used the post-office names where it has been necessary to distinguish a part of a settlement. I have not attempted to give here the origins of the names of the settlements, since this subject is treated in part in the earlier Monograph on Place-nomenclature, and the names not there considered will be discussed in the addenda to the present series, later to appear.

In this list each settlement is necessarily treated individually and very briefly, while lack of space prevents any reference to those larger events which have influenced its origin in common with the origins of others more or less nearly related to it historically. These facts are, however, given in Part II., and the reader should look back to the pages of that part indicated by the context. Since the great majority of New Brunswick settlements are determined by farming,

I have, to save repetition, allowed this to be assumed in all cases where no other determinant is mentioned. Also for similar reasons I apply the name native settlers to those of English-speaking descent, although the word applies equally well to the Acadians.

As some interval has elapsed between the printing of the earlier part of this paper and that which follows, I have been able to secure additional information upon some points. Hence this part is more complete and accurate than the preceding, and in case of any discrepancy between them, the following part is to be accepted as most authoritative.

The sources of information for this list have in part been indicated in the preceding pages, and they will be mentioned in part in the "Sources of Information" in the Appendix. The abbreviations used have the following meanings:—

C.L.R. Records in the Crown Land Office at Fredericton.

C.R. Council Records, Memorials for Land, in the Provincial Secretary's Office at Fredericton.

Est. Established.

Hist. Sites: The earlier Monograph on Historic Sites.

Loc. inf. Local information derived from residents, either by personal inquiry or by letter.

Letters after names are initials of counties:—But J. signifies St. John; Cn., Carleton; Kt., Kent.

Italics signify always that the word so printed is given in the list in its alphabetical position.

Abbreviations in names of publications are explained in the Bibliography.

Aberdeen,—Cn. Parish est. 1863; settled first in 1860 by Scotch immigrants at *Glassville*, and elsewhere later by their expansion and by American and native settlers, as noted under the names of the settlements.

Aboushagan,—W. Also Naboujagan, l'Aboujagane, Beaujoggin. Acadian settlement, formed about 1810 by expansion from Memramcook and Fox Creek. (Plessis, 184, 254; loc. inf.).

Aboushagan River,—W. Former Indian Reserve of 250 acres, now withdrawn. (Perley, Ind. CXIV.).

Aboushagan Road,—W. Modern native farming village, an expansion from Sackville. (Loc. inf.).

Acadienne, La Pointe.—N. Former small Acadian refugee village, formed between 1750 and 1755 (under the same circumstances as *Boishébert*), on the present unsettled Canadian Point. (Hist. Sites, 295.)

Acadieville,—Kt. Recent Acadian settlement, formed under the Free Grants Act, about 1874, on the line of the I. C. Railway, by expansion from older parts of Kent, and erected into a parish in 1876. (Adams, 22; C. L. R.).

- Acton**,—Y. Irish immigrant settlement, founded in 1842 on the Fredericton-St. Andrews Road by some 20 families. (Johnston, N. A., II, 175; also, with all their names, in his Report, 95.)
- Adair Settlement**,—Q. Apparently an early name for *Enniskillen*.
- Adamsville**,—Kt. Recent Acadian settlement formed under the Free Grants Act in 1879 on the I. C. Railroad, by expansion from native sources, mainly from Prince Edward Island. (Adams, 33; loc. inf.).
- Addington**,—R. Parish est. 1826, including the earliest settlements of *Restigouche*, and some later Scotch and French immigrants, as noted under the respective settlements.
- Albert**,—W. Former name of *Fredericton Road*.
- Albert**,—A. Thriving village at the terminus of the Albert Railway, settled first as an original part of *Hopewell*.
- Albert Mines**,—A. Former mining village, attracting residents from many sources, formed about 1850 for the mining of albertite, and largely abandoned on its exhaustion, about 1875. (History of the industry in Burtis' New Brunswick, 44; Bailey, Report Geological Survey, 1897, 69 M; Hind, Geological Report, 1865, 91).
- Aldouane**,—Kt. Also Ardouane, l'Aldouane and now St. Charles. Important Acadian village, formed about 1790 by some 15 families, who had been transported to England from Nova Scotia in 1755-56, went to St. Malo in 1763, to Bonaventure (Quebec) in 1774, and thence to Aldouane. (Gaudet, Ms.; Plessis, 180; Cooney, 149.) Has grown steadily to the present, expanding to other parts of Kent.
- Allandale**,—Y. Scotch and Irish immigrant settlement, formed about 1845 (surveyed 1842). (Loc. inf.).
- Alma**,—A. Parish est. 1855; contains two sets of settlements,—(1) the lumbering and farming Alma Village and neighbouring coast, formed about 1810 by natives of Nova Scotia, who have expanded to the back lands, including *Hastings*, and (2) the later settlements along the Shepody Road, formed by Scotch and Irish immigrants at *Roxborough* and *New Ireland* (in part).
- Alma**,—Y. Recent settlement, formed about 1860 under the Labour Act, by expansion from older native settlements. (Loc. inf.).
- Almeston**,—K. Another name for *Amesbury*; correctly *Olmaston*.
- Alnwick**,—N. Parish est. 1786; includes the early Indian *Skinouboudiche*, *Tabusintac*, the early French *Fronsac*, the early Acadian *Neguac*, *R. du Cache*, and modern Acadian and native expansion settlements, treated under their respective names.
- Alston Point**,—G. Site of a former trading post founded about 1766 by Commodore Walker, and destroyed by American privateers in 1776. (Cooney, 171; Hist. Sites, 330).
- Alwington**,—K. The Manor property of Colonel Coffin near the mouth of the Nerepis, purchased by him from B. P. Glasier (*Glasier's Manor*), grantee in 1765; now sold to many settlers.

- Amesbury**,—K. Former township, east of the St. John in Kings and Queens, granted in 1765 to a company but not settled by them. (Hist. Sites, 326, 333; Coll. N.B. Hist. Soc., I, 100).
- Anagance**,—K. An I. C. Ry. Station, est. 1858, in a native expansion district settled about 1810. (Loc. inf.).
- Anderson**,—W. Native settlement, formed about 1850 by expansion from older parts of Botsford Parish. (Loc. inf.).
- Anderson**,—G. Scotch immigrant settlement, formed about 1840 by several families from Dumbarton. (Loc. inf.).
- Anderson Settlement**,—C. Apparently native expansion from older parts of Charlotte. (Loc. inf.).
- Andover**,—Parish est. 1833; settled originally along the St. John by native settlers from the Lower St. John and by a disbanded British regiment. Andover village was first settled about 1816 by two brothers named Murphy, from Ireland, and in 1817 the Kent regiment was settled along the river from River de Chute to the Aroostook, excepting, perhaps, a *French location*. Later the village (at first called Tobique Settlement) with accessions from Maugerville and other parts of the lower St. John, became the centre of lumbering operations for the Aroostook and Tobique and grew prosperously, reaching its culmination between 1840 and 1870; it became the shire town of Victoria in 1876. The back settlements are later expansions from the river settlements. (Ms. notes by W. B. Hoyt. of Andover; Baird's *Seventy Years*, ch. II; Johnston, N.A., I, 59; Smith, *History of Methodism*, II, 264).
- Andre Settlement**,—M. Another name for *Quisibis*.
- Apochoqui**,—K. I. C. Ry. Station, est. 1858, in the midst of Loyalist settlements; includes the older *Studville*. Near is a former Indian village (Hist. Sites, 228) and a modern encampment.
- Archibald**,—R. Native settlement formed about 1840 by expansion from the neighbouring coast. (Loc. inf.).
- Arthuret**,—V. Important settlement, the oldest on the Tobique, formed before 1860 by expansion of native settlers from the St. John. (Gordon, *Wilderness Journeys*, 45).
- Association Tract**,—Q. Laid out about 1864 on Salmon River for an association in St. John, but hardly at all settled. Another was laid out earlier on Washademoac at Rider's Brook, but was not settled.
- Athol**,—R. The point and farm above Campbellton, settled by Robert Ferguson from Scotland in 1796 or later; he made it for many years the principal place and business centre of the Restigouche. (Herdman, *Restigouche*; Lanman, *Adventures in the Wilds of the United States and British American Provinces*, II, 54-70; many other references occur in various books, which are summarized in *Educational Review X*, March, 1897); now Ferguson's Point and the site of great lumber mills.
- Aucpac**,—Y. Former important Maliseet Indian village, probably pre-historic, located in a charming central situation on the site of Springhill and the intervale island, Savage Island, near it. It rose to importance in

the middle of the 18th century, doubtless, because the Indians desired to be near the French settlers of the lower St. John, and it became the council-place and chief village of the river. Its site with 504 acres of land was reserved for them by the Nova Scotia Government, October 29, 1765, but they sold this land in 1794 to Colonel Allan, and in 1816 they were settled by the Government at the present *Indian village* in Kingsclear. (Hist. Sites, 226; Raymond, River St. John, 140; Winslow Papers, 332.)

Babineau,—A. Former small Acadian refugee village in Coverdale, probably formed after the destruction of the Petitcodiac settlements by the British in 1755, and destroyed by them in 1758. (Hist. Sites, 282.)

Baie des Ouines,—N. Also Baie des Windes, and Bay du Vin. Former considerable Acadian settlement on the south shore of Miramichi Bay opposite Bay du Vin Island; origin and history uncertain, but the traditions given by Cooney (32), and the local Acadian tradition that it was the headquarters of Richard Denys de Fronsac, are, without doubt, incorrect. It was probably founded by emigrant Acadians from the peninsula of Nova Scotia after 1750, enlarged by refugees of the expulsion after 1755, and destroyed by the British in 1758. The 15 Acadian families reported in 1761 from this place were probably its former (*i.e.*, prior to 1758) residents. A local tradition says that the present Bay du Vin Acadian settlement at lower Bay du Vin, or French Bay, was formed by a part of a group of Acadians who, immediately after the conquest of Canada in 1760, came from Nova Scotia to settle River du Cache, and Smethurst in his "Narrative," shows that River du Cache was apparently first settled in 1761. It is very probable the tradition is correct. The present settlement has certainly been in existence since 1800. (Hist. Sites, 295; Plessis, 177.)

Baie Verte,—W. Former Acadian village of some importance, founded probably at the close of the 17th century as a port of shipment for produce of the Chignecto region to Quebec and (later) to Louisburg. It was taken and destroyed by the English at the expulsion in 1755 and was settled soon after 1761 by an expansion of the New England settlers of Sackville and Cumberland, whose descendants, with some later additions, occupy it to this day and have expanded to Port Elgin and the coast to the eastward. (Hist. Sites 281; loc. inf.; Smethurst, 29.)

Baillie,—C. Irish (North of Ireland) immigrant farming settlement, formed in 1828. (Loc. inf.; Johnston, Report, 83.)

Baillieville,—V. Former lumbering village, commenced prior to 1843 at Red Rapids on the Tobique; it was a failure and soon abandoned.

Bairdsville,—V. Native settlement, founded in 1823 by expansion from the lower St. John, the original founders being followed by relatives of the same name. (Baird's Seventy Years, chapter II; Raymond, Carleton Co., No. 85.)

- Baker Brook**,—M. American immigrant lumbering and farming settlement, formed in or soon after 1820, by John Baker and others. Baker attempted to transfer Madawaska to the United States and thereby figured prominently in the documents of that period. (History in "Remarks on the Disputed Points of Boundary," St. John, Second Ed., 1839, Appendix VI; also C. R.).
- Baker Lake**,—M. Recent Acadian settlement, formed in 1881, and later under the Free Grants Act by expansion from older parts of Madawaska. (Loc. inf.; C. L. R.).
- Ballyshannon**,—S. Also Friendship Hill (?). Irish immigrant farming settlement, formed after 1842. (C. L. R.).
- Balmoral**,—R. Parish est. 1876. The settlement was originally laid out in 1856, but chiefly settled under the Free Grants Act in 1874 and later by English immigrants (285 in number) from the vicinity of Bristol (many of whom have since removed) with the addition of native and Acadian expansion from the older settlements. (Adams, 12; Herdman, Restigouche; Stevenson's Report for 1874 gives a full account). Has expanded to Blair Athol and Queen Anne settlement.
- Baltimore**,—A. Early native farming settlement (with some later temporary mining), formed about 1815 (?) by expansion from Hillsborough. (Loc. inf.).
- Barachois**,—W. Acadian settlement, formed soon after 1800 by Charles Gautreau and others, an expansion from Memramcook. (Loc. inf.; Plessis, 183, 254).
- Barnaby River**,—N. Settled after the great fire in 1825 by Irish immigrants, from the Miramichi, and originally from County Longford, Ireland; most of whom had been employed by the Gilmour and Rankin establishment. They expanded soon to *Nelson* village, and later to *Semivagan Ridge*. (Loc. inf.).
- Barnesville**,—K. Formed about 1820 by native expansion from *Hammond River*. (Loc. inf.).
- Barnesville**,—Kt. Established under the Free Grants Act, 1901.
- Barony**,—Y. Native farming and lumbering settlement gradually formed by expansion from the neighbourhood and the lower St. John on lands granted Hon. John Simcoe Saunders in 1792 and gradually sold to the settlers. (C. L. R.).
- Bartibog**,—N. Scotch and Irish immigrant settlements. Apparently settled at its mouth by some Scotch Roman Catholics prior to 1812 (Plessis, 173), who probably came from Prince Edward Island, to which they emigrated in 1772, led by John MacDonald of Glenaladale (MacLean, *Highlanders in America*, 232). The river above its mouth was settled by Irish immigrants about 1822. (Cooney, 119).
- Basswood Ridge**,—C. An expansion of the Scotch settlement of *Scotch Ridge*. (Loc. inf.).
- Bathurst**,—G. Parish est. 1826. Includes early Indian, French and Acadian settlements, considered under *Nepisiguit*, and some latter immigrant settlements, considered under their respective names. The permanent

settlement appears to have begun with an Acadian refugee settlement on the west side around the harbour soon after the expulsion in 1755; these settlers numbered several hundred in 1761, (Smethurst, 9; Archives, 1894, 229; Murdoch, II, 408), and they probably lingered there until 1772, when the ancestors of the present Acadian families were certainly resident there, (Gaudet, *Le Courrier des Provinces Maritimes*, May and June, 1889; May 31, 1894). Plessis in 1811 refers to it as one of the oldest settlements in Bay Chaleur (Plessis, 119). In 1768 Commodore Walker had a trading establishment at *Alston Point*, and after its destruction some of his men seem to have lingered here engaged in fishing until 1784, when all the southeast part of the harbour was granted Colonel Goold, under whom certain fishermen were settled here (Coll. N.B. Hist. Soc. II, 125), and under whose grant these lands are still held. In 1789 James Sutherland from England settled on the northeastern part of the harbour with some others (Biggar, *St. John Sun*, May 18, 1894, and *Canadian Magazine*, May, 1894; errors in this article shown by Gaudet, above cited); and in 1794 Hugh Munro, a Loyalist from Gaspé, settled at the mouth of the Tetagouche, while in 1825 the Allan grant was escheated and regranted as Youghall to English speaking settlers, apparently native expansion of other parts of the Province. It is locally said that the site of the present town of Bathurst was not settled until 1820, (*St. John Sun*, November 4, 1887) and was at first called Indian Point, while the Acadians from early times have occupied Bathurst village, doubtless the place originally called *St. Peters*. It subsequently grew rapidly under the stimulus of the Nepisiguit timber trade and reached its culmination in the 50's. Has been the shire town of Gloucester since 1826.

Bay du Vin,—N. Included earlier French settlements considered under *Baie des Oujes*. Settled in 1786 and later at Bay du Vin River and along Vin Harbour by Loyalists. (Loc. inf.; Coll. N.B. Hist. Soc., II, 101).

Bayfield,—J. A tract laid out for settlement in 1856, but never occupied.

Bayfield,—W. Village at the intersection of the Emigrant and Coast Roads, and later a railway terminus, formed amongst the native expansion settlements of this part of *Botsford*. (Loc. inf.).

Beaconsfield,—C. Recent native settlement, formed in 1878 under the Free Grants Act by expansion from Charlotte. (Adams, 24; loc. inf.).

Beaubassin,—(Nova Scotia). Also Chignecto. Former important Acadian settlement, founded in 1671 on the marshes of Cumberland Basin, principally near the present Amherst and Fort Lawrence. In 1750 it was burnt and abandoned by its inhabitants, who later settled on the St. John and along the North Shore. The New Brunswick portion is considered under Beauséjour. (General Histories of the Region).

Beaufort,—Cn. Modern native settlement formed under the Free Grants Act in 1877 by expansion from St. John and elsewhere (including some who had lost their homes in the great fire), under the auspices of Beaufort Mills, of St. John. (Loc. inf.; Adams, 24).

Beausejour,—W. Former important Acadian village, founded probably soon after 1671 as a part of *Beaubassin*, around the present Fort Cumberland,

later expanding to form *Wescak, Prée des Richards, Prée des Bourgs, Tintemarre, La Coup, Le Lac, Baie Verte, Portage*. It was included in La Vallière's Seigniorship of 1676 and ravaged, no doubt, by Church in 1696 and 1704. In 1750 Fort Beauséjour was built; it was taken in 1755 by the English and re-named Cumberland, and the Acadians were expelled. After 1760 it was re-settled as *Cumberland Township* by disbanded soldiers and New Englanders. (Hist. Sites, 278, 280, 315, and in general works).

Beaver Dam,—Y. Native settlement, formed about 1830 by expansion from Maryland. (Loc. inf.)

Beaver Harbour,—C. Originally settled as a part of *Pennfield*.

Becaguimec,—Cn. Settled above its mouth after 1820 by an expansion of native settlers from the St. John.

Beersville,—Kt. Small settlement, formed in 1902 at small coal mines; in 1903 some Belgian miners were brought here by a company, but soon returned to their homes. (Newspapers).

Belair,—Kt. Former temporary Acadian refugee settlement on the north side Cocagne River, one mile above the present church, mentioned in documents of the time. (Loc. inf.; Hist. Sites, 291).

Belledune,—G. and R. Early Irish and Scotch immigrants. The Irish came chiefly from the Miramichi after the great fire of 1825, and were joined from time to time by others from Tipperary, Ireland, and settled chiefly at Little Belledune and thence to Jacquet River. The Scotch, led by Hugh Chalmers, came, in 1832 and later, from Ayrshire and settled at Belledune, expanding thence along the coast to Belledune River. (Loc. inf.; Cooney, 200; Johnston, N. A., II, 4, and Report, 85).

Bellevue,—C. Town laid out, in 1783, at Beaver Harbour for the Loyalists of *Pennfield*, but soon abandoned.

Belliveau,—W. Acadian repatriation settlement, founded in 1768 or 1769 by Pierre Belliveau and others on the salt marshes occupied by Acadians (as *Pierre-à-Michel*) before the expulsion; has grown and expanded much. (Hist. Sites, 282; Gaudet, N.B. Magazine, II, 34; L'Évangéline, Sept. 24—Oct. 29, 1891; March 10, 1892; Le Moniteur Acadien, Feb. 19—26, 1892).

Bend,—W. Former name for the village which has since grown into the city of *Moncton*.

Benton,—Cn. Earlier Rankine's Mills. Modern mill village at the falls of Eel River; first settled after 1816 by expansion from the St. John, and developed rapidly after the building of the railroad. (Loc. inf.; Baird's Seventy Years, 179).

Beresford,—G. Parish est. 1814. Settled first by Acadians in 1797 at *Petit Rocher*, and later by their expansion, and by Scotch immigrants as noted under the respective settlements.

Berry's Mills,—W. Small mill village, formed about 1812, by immigrants from the United States. (Loc. inf.).

Big Cove,—Kt. The Micmac reserve at *Richibucto*.

- Big Hole**,—N. Micmac Indian reserve (not now occupied), est. March 5, 1805, with 8,700 acres; now much reduced.
- Big Salmon River**,—J. Modern small mill village, begun after the original grant in 1834, and more or less continuously occupied since. (History in *St. John Sun*, October 23, 1897).
- Birdton**,—Y. Early Irish immigrant settlement, formed about 1824 by settlers from County Donegal, Ireland. (Loc. inf.).
- Bishops Land**,—Kt. See *St. Paul*.
- Black Brook**,—N. Settled prior to 1785 by one Blake, traditionally said to have been commander of the ship which destroyed Burnt Church; and later by various Scotch settlers of *Miramichi*, now *Loggieville*. (Loc. inf.).
- Black River**,—Kt. Earlier called Glenelg. Scotch immigrant settlement, formed prior to 1849 (probably in the 20's) on the Buctouche-Richibucto highway by Highlanders from Inverness; in recent times largely replaced by Acadians. (Johnston, N. A., II, 61).
- Black River**,—N. Early Scotch immigrant, first settled about 1790, by Major Macdonald of the 78th Highlanders, with three men of the same disbanded regiment (settled on south side Bay du Vin); their descendants, joined by other Scotch immigrants have expanded to near the head of this river. (Loc. inf.; Johnston, N. A., I, 111; Gesner, 188).
- Black Rock**,—G. An expansion of the Irish settlement of *New Brandon*. (Loc. inf.)
- Blackville**,—N. Parish est. 1830. Settled along the *Miramichi* prior to 1801 by expansion from the Loyalist settlements of the *St. John*, and from the early (mostly Scotch) immigrants of the lower *Miramichi*. Above the mouths of the smaller rivers settled by later immigrants mostly from Ireland. (Loc. inf.)
- Blaney Ridge**,—Y. (Prince William). Irish immigrant settlement, formed about 1830. (Loc. inf.)
- Blissfield**,—N. Parish est. 1830; settled first along the *Miramichi* prior to 1800 by expansion from the *St. John* and lower *Miramichi*, and in the vicinity of *Doaktown*, by Scotch immigrants from Ayrshire; the *Cains River* settlements are Irish immigrant. (Loc. inf.). The later Free Grants settlements are mentioned under their respective names.
- Blissville**,—S. Parish est. 1834; includes three sets of settlements,—(1) Loyalist, established 1785-86 along the *Oromocto* to above the Forks, and (2) Loyalist expansion prior to 1810, up Back Creek, and (3) later Irish immigrants in the upland settlements, considered under their respective names. (C L R.; interesting reference in Gesner, 158).
- Bloomfield Ridge**,—Y. N.B. and N.S. Land Company settlement formed about 1842 by various immigrants from Great Britain, with some native expansion from Boiestown and elsewhere in the vicinity. (Loc. inf.)
- Blowdown Settlement**,—Cn. Settled about 1840 by expansion from the *Keswick*. (Loc. inf.)

Bocabec,—C. Pre-historic Indian (Passamaquoddy) village at the east entrance of Bocabec River; aboriginal name unknown. It is notable as being the most thoroughly studied of the ancient village sites of the Province (detailed description by G. F. Matthew, in Bulletin N.B. Nat. Hist. Soc. No. 3, 1884, 6; reprinted in No. 10, 1892, 5). First settled in 1784 by the Penobscot Association of Loyalists as part of the block extending from Bocabec River to Chamcook. (Vroom, Courier, CVI.).

Boiestown,—N. Early American immigrant farming mill and post village founded in 1821 by Thomas Boies with others of his countrymen from the United States, who made here a prosperous settlement, reaching its culmination prior to the building of the Canada Eastern Railroad. (Several interesting accounts of this village have been printed; McGregor's British America, II, 263; Cockburn, Report, 85; Cooney, 111).

Boishebert,—N. Former extensive but temporary French refugee settlement, on Wilson's Point and Beaubears Island, formed probably in 1750 by emigrant Acadians from the peninsula of Nova Scotia, and greatly increased in 1755 by refugees from the expulsion. It became the largest refugee Acadian settlement, having some 3,500 inhabitants in 1756, who suffered so severely from famine that next year many removed to Restigouche, founding *Petit Rochelle*. It was ravaged and destroyed by the English in 1758, after which the remainder of the settlers apparently went to Petit Rochelle. (Hist. Sites, 295; Ms. from Gaudet; Histories of the time).

Boishebert Fort. Formerly stood at the mouth of the Nerepis. (Hist. Sites, 276; Raymond, St. John River, 104.)

Boland Settlement,—S. Irish immigrant, formed about 1848. (Loc. inf.).

Bonum Gould,—W. Acadian farming village, formed about 1830 by expansion from Memramcook. (Loc. inf.)

Botsford,—W. Parish est. 1805. It contains several sets of settlements, including (1) early native expansion (prior to 1810) from Westmorland and Sackville along the coast to Cape Tormentine and Jourimain (C. L. R.). Beyond are (2) early English immigrants of about 1820 (*Murray's Corners*) to Shemogue. Thence to the eastern boundary are (3) Acadian settlements of various ages considered under their respective names, while in the interior are (4) later immigrant, and (5) native expansion settlements, considered under their respective names.

Botsford Portage,—W. Irish (with some English) immigrants, formed about 1825 (Loc. inf.), on the direct road from Cape Bald to Shemogue.

Boyle,—S. Irish immigrant settlement, formed after 1842. (C. L. R.).

Breadalbane,—N. Tract laid out for settlement on the Dungarvon in 1856, but never settled. Breadalbane East was laid out under the Free Grants Act in 1879, and is being settled by expansion from neighbouring settlements. (C. L. R.)

Bright,—Y. Parish est. 1869; includes two sets of settlements, (1) Loyalist disbanded regiments, The Royal Guides and Pioneers and other Loyalists on the lower Keswick and St. John, settled 1784 and later, (2) some N.B. and N.S. Land Company native expansion settlements on the upper Keswick and westward, considered under their respective names. History of the regiments by Raymond in Coll. N.B. Hist. Soc. II, 211; locations in Hist. Sites, 343 and Map 46).

Brighton,—Cn. Parish est. 1830; settled along the St. John, mostly between 1800 and 1812, almost entirely by expansion of native settlers from the lower St. John who have expanded up the *Beeaguimac* and to the interior after 1820 and to *Cloverdale* recently.

Brockway,—Y. Early American immigrant lumbering and farming settlement, formed in 1818 or soon after, near the fine intervalles of the Magaguadavic by Reuben and Rufus Brockway with others from New Hampshire. The road from Fredericton to St. Andrews crossing the Magaguadavic here was built later, about 1835. (C. R.; loc. inf.; Gesner, 163).

Brothers,—J. Indian (Maliseet) reserve of two islands, of 10 acres, occupied as a summer camping ground, established September 19, 1838. (Perley, Ind., CXXVII).

Brown's Ridge,—S. Recent native settlement, formed under the Free Grants Act about 1879, by expansion from older settlements. (Loc. inf.).

Brunswick,—Q. Parish est. 1816; settled first in 1792 along the Canaan River, at *New Canaan*, by expansion of the Loyalists of the St. John, and later, after 1800 (grants 1809), by native expansion thence to Johnston and in the interior. A Labor Act tract laid out at Rider's Brook about 1859 was never settled. (C. L. R.).

Buber,—Cn. Now *Summerfield*.

Buctouche,—Kt. Indian reserve, established November 1, 1810, but reduced in size in 1823 by throwing open of a part for settlement. Has a permanent settlement (Perley, Ind. CXIII).

Temporary Acadian refugee settlement of 1760, doubtless at the mouth of Black River, where old traces of settlement formerly existed.

Its permanent settlement began in 1786 by the arrival of five Acadian families from Memramcook, who settled around the mouths of Buctouche, Black and Little rivers, and have extended up the river and to the neighbouring back lands. Later, probably after 1800, English settlers, probably an expansion from Cumberland, settled on the south side of the Harbour and on Little River, and they were joined by some Irish immigrants, originating the English-speaking settlement of those places. In 1822-23 a large Indian reserve on the south side of the river was thrown open to settlement, and was taken up mostly by Acadians. The village of Buctouche is of later date and has grown up as a distributing centre since the completion of the B. & M. railroad. (History by Gaudet in *Le Moniteur Acadien*, December 24, 1889 and later, and February 28, March 4, 1890; Plessis, 180; Cooney, 153; Johnston, N. A., II, 62; Winslow Papers, 499).

Burnsville,—G. Modern name of the mill village formerly called *Millville*.

Burnt Church,—N. Important Indian (Micmac) village, with an Indian reserve, established March 5, 1805 (with 2,058 acres). (Perley, Ind., XCIX.). It is on the same site as the ancient *Skinouboudiche*. Now commonly called Church Point, and also La Mission.

Here or near by was probably the fortified dwelling of Richard Denys de *Fronsac*, and it was, perhaps, occupied by French more or less continuously from that time down to the close of the Acadian period, and it was probably the combined French-Indian church which was burnt by the British in 1758, originating the name.

The modern village of this name, locally called New Jersey, together with the English speaking settlement at Church Point, were founded about 1800 by expansion of the Scotch settlers of Miramichi. (Hist. Sites, 232, 295; Plessis, 170).

Burton,—S. Early township granted a company in 1765, but only slightly settled by them. (Hist. Sites, 326, 333; Coll. N.B. Hist. Soc. I, 105).

Parish est. 1786 and made the shire town; settled in part by New Englanders along the St. John, as noted in the reference above, chiefly by Loyalists along the St. John and Oromocto, and by Loyalist expansion to *Geary*. The interior settlements are mostly of immigrants as recorded under their respective names.

Butte a Roger,—W. Former temporary Acadian fortified post near Fort Beau-séjour, abandoned in 1755. (Hist. Sites, 285).

Butternut Ridge,—K. Early native settlement formed about 1810 by expansion from *New Canaan*. With good lands it has prospered to the present, expanding to give origin to other settlements in the vicinity. (Full history in *St. John Sun*, July 27, 1892; loc. inf.; Johnston, N. A., II, 113).

Caie Settlement,—Kt. Recent native settlement, formed about 1873 under the Free Grants Act by expansion from neighbouring English settlements. (Adams, 22).

Cains River,—N. Settled at its mouth by native expansion about 1800 (C. R.) up to Sabbies (Savoys) river in or after 1818, and above that by Irish immigrants in or after 1825. (Loc. inf.)

Caledonia,—A. Early native settlement, with, perhaps, some Scotch immigrants, formed about 1810 (?) by expansion from older neighbouring settlements. (Loc. inf.).

California,—Q. Early Scotch immigrant settlement, formed after 1820. (Loc. inf.).

California,—V. Formed after 1849 by settlers from the lumbering establishment of *Four Falls*. (Loc. inf.).

California Settlement,—Y. Said locally to have been settled by returned California miners.

Cambridge,—Q. Parish est. 1852; includes the pre-Loyalist *Spryhampton*, but apparently its settlement is entirely Loyalist, commenced in 1784 and later, along the St. John, Grand Lake and Washdemoak, with expansion later to the interior. (C. L. R.; article on the White Family in the *St. John Sun*, February, 1893).

Campbellton,—R. Settled first by a French village (of unknown name), with later a trading post at Walker's Brook, and in 1776 by two families of Aberdeen fishermen employed by Shoolbred for the Restigouche salmon fishery. From this time on it was occupied by various Scotch immigrants, who came to this region in slowly increasing numbers (see *Restigouche*). After 1815, with the development of the lumber trade, it began to grow into a village (Martin's Point), which after 1832 took on a rapid growth forming a considerable town, from which time it has grown steadily and is now the centre of the lumber trade of the Restigouche. Incorporated 1889. (Loc. inf.; Cooney, 215; Herdman, *Restigouche*; Johnston, I, 397).

Campbell Settlement,—Y. See *West Campbell*.

Campbell Settlement,—K. Early native expansion settlement. (Loc. inf.)

Campbell Settlement,—Y. Native farming settlement, formed about 1835 by expansion from the neighbouring St. John river settlements. (Loc. inf.).

Campbelltown Settlement,—Y. Also Campbell. Formed in 1834 by the N.B. and N.S. Land Company on land purchased from the Cunards of Miramichi, and settled chiefly by expansion from the Miramichi settlements. (Loc. inf.; Kendall's Report, 15).

Campobello,—C. Parish est. 1803. Includes three sets of settlements, the New Englanders of *Wilson's Beach* (came 1766), the English immigrants originally settled at *New Warrington* (came 1770), and the later Loyalist and other settlers scattered over the island. It is now largely owned by an American company, who purchased it in 1881 from the heirs of the original grantees. (Its history has been fully written in Coll. N.B. Hist. Soc., I, 193, and II, 8; also in Mrs. Wells' "Campobello, an Historical Sketch," Boston, 1893, second edition 1902, privately printed; *Vroom Courier* CXXI-CXXIII; Winslow Papers, 490).

Canaan,—J. See *New Canaan*.

Canaan,—V. Recent native lumbering and farming settlement, an expansion from the St. John river military settlements, prior to 1877. (Newspaper item).

Canadian Point,—N. See *Acadienne, La Pointe*.

Canning,—Q. Parish est. 1827; includes the pre-Loyalist *Mount Pawlett*; settled entirely by Loyalists in 1784 and later, with some additions from various sources around the coal mines at Newcastle. (Loc. inf.; C. L. R.).

Canoose,—C. An unoccupied Indian reserve of 100 acres.

Modern settlement established in 1878 under the Free Grants Act, and settled by native expansion from older parts of New Brunswick, with a few settlers from Maine. (Adams, 23).

Canterbury,—P. Parish est. 1855. Settled along the St. John in 1784 by a disbanded Loyalist regiment, The King's American Regiment, along Eel river by native expansion settlements of various dates, and in the interior by native expansion and immigrant settlements considered under their respective names. See also *Howard Settlement* (History of

the Regiment by Raymond in Coll. N.B. Hist. Soc., II, 203; location in Hist. Sites, 343, Map 46). The lands around the settlement were, in 1851, reserved for the St. Andrews and Quebec Railway, retarding settlement there. (6th Rep. C. L. Office, XII).

Cape Bald,—W. See *Cap Pelée*.

Cap Pelee,—W. Prosperous Acadian settlement, formed about 1813 by expansion from Memramcook, Fox Creek and Minudie. It has grown greatly and expanded to other parts of the Province. (Loc. inf.)

Caraquet,—G. Important Acadian farming and (especially) fishing settlement, one of the oldest, and perhaps the oldest in New Brunswick. The local tradition, confirmed by the occurrence of non-Acadian and non-Canadian French names in the settlement, is that it was founded about 1760 by sailors from a French man-o-war driven into St. Simon's Bay by an English war vessel and sunk there; the sailors are said to have retired to Lower Caraquet, where some of them married squaws and originated the settlement. There were settlers here in 1761 (Smethurst), and the church registers date from 1772 (Gaudet). In 1784 lands were granted here to 27 French families, since which other Acadians (especially at Upper Caraquet) and some Canadian French, together with a few English families have joined the settlement which has grown greatly and expanded to other parts of Gloucester. Erected as a parish in 1831. (Loc. inf.; Plessis, 109; Hist. Sites, 301; Johnston N. A., II, 20; Rameau, II, 279; Winslow Papers, 501).

Cardigan,—Y. Early Welsh immigrant settlement, founded in 1819 by some 27 families from Cardigan, Wales. They have expanded to Woodlands, Hamtown and vicinity. (Loc. inf.; McGregor, I, 79; full history of this settlement in *Royal Gazette*, August 10, 1819, to February 15, 1820).

Cardwell,—K. Parish est. 1874. Settled along the Kennebecasis and its branches after 1800, by expansion from the Loyalist settlements lower on the river; and these have expanded to the uplands. Later native expansion from St. John formed *Mechanics Settlement*.

Carleton,—J. A Loyalist town founded in 1783, at the same time with *St. John*, and united with it in 1785. It is on the site of the earlier settlements *Menagoueche* and *Conway*.

Carleton,—Kt. Parish est. 1814; settled first at *Kouchibouguac* about 1800, by native settlers, with some immigrants, and soon after by Acadians at *Point Sapin*, with a later settlement at *Lake Settlement*.

Carlingford,—V. Modern name of a native settlement, formed about 1840 by expansion from the St. John along the portage road to the Aroostook. (Loc. inf.).

Carlow,—Y. and S. Small Irish immigrant farming settlement, on the Fred-erickton-Richibucto road, now nearly abandoned, formerly called Max-well. (Loc. inf.).

Case Settlement,—K. Loyalist expansion settlement, formed about 1800, from the neighbouring settlements. (Loc. inf.).

Caverhill,—Y. Early Scotch immigrant settlement, formed in 1820, by Dr. Caverhill with several other families from the south of Scotland. (Loc. inf.).

Centerville,—Cn. Formerly Perkins Corner. Modern village amid a native farming settlement, founded about 1855, by natives of Kings County and Maugerville. The distributing centre for a prosperous farming country. (*St. John Sun*, February, 1893).

Centre Village,—W. Native settlement, formed about 1860, by expansion from Sackville and Botsford. (Loc. inf.).

Chamcook,—C. Loyalist village; settled after 1785, by expansion from neighbouring Penobscot association settlements (Vroom, in *Courier*, CVI). In 1835 there was a wet-dock and a paper mill here (Wedderburn).

Chance Harbour,—J. Loyalist fishing village; settled in 1784 by a few families. (Loc. inf.).

Chapmanville,—Cn. Native settlement, an expansion from Johnville, with other settlers, mostly native. Established 1880 under the Free Grants Act. (Adams, 25; Loc. inf.).

Charnisay,—J. Early French fort, built in 1645, at the mouth of the St. John. (Hist. Sites, 277).

Chartier,—C. Former small French habitation and grant on the site of *St. Stephen*, established about 1695. (Hist. Sites, 226, 308).

Chatham,—N. Parish est. 1814; originally settled after 1770 along the Miramichi, mostly by Scotch settlers (see *Miramichi*), and later by Scotch immigrants at *Napan*, which see.

The town of Chatham has grown up since 1812 under the stimulus of the great timber trade of the Miramichi river, and as the trading centre of the surrounding country. It was incorporated 1896. (Loc. inf.; Cooney, 107).

Chauffours,—Kt. Early temporary French habitation, founded in 1681 or 1682, at a site unknown on the south bank of the Richibucto. (Hist. Sites, 291.)

Chediac,—W. See *Shediac*.

Chester,—A. Settled about 1825 by expansion from the *Shepody* settlements.

Chignecto. An alternative name for *Beaubassin*.

Chipman,—Q. Parish est. 1835. Settled along Salmon river, mostly after 1800, by native settlers, mixed with some immigrants, and on the backlands and the Gaspereau by later immigrants, as noted under those settlements.

Within recent years, mostly since 1890, a prosperous mill village has grown up at the intersection of the Central Railway with Salmon river. It is called Chipman, earlier Lillooet.

Chipoudi,—A. See *Shepody*.

Chockpish,—Kt. Also Chockpiche; now Ste. Anne. Acadian settlement, formed about 1820 (survey, 1821), probably as an expansion from Richibucto or Buctouche.

- Choufour**,—Q. Former small Acadian village, just below Gagetown, destroyed by Monckton in 1758. (Hist. Sites, 271).
- Church Point**,—N. Present name for the Indian village and adjoining English speaking settlement formerly called *Burnt Church*.
- Clair**,—M. Parish est. 1900. Settled originally along the St. John by native settlers, with some immigrants and some Americans joined by many Acadians, and on the backlands by Acadians, an expansion from the settlements lower on the St. John, as noted under the respective settlements.
- Clarence Hill**,—C. Immigrant settlement, Scotch and Irish, formed after 1831. (Loc. inf.).
- Clarendon**,—C. Parish est. 1869. An original Clarendon tract laid out for settlement in 1856 in Charlotte and Queens was never taken up, but the present Clarendon settlement, laid out in 1860, has been settled by expansion from the neighbouring Irish settlements on the Nerepis, and there are a few settlers in *Ferriebank*. (Loc. inf.).
- Clearwater**,—G. Tract laid out in 1868 for settlement, but never occupied.
- Cloverdale**,—Y and Cn. Recent native settlement, formed in 1878 under the Free Grants Act, and settling by expansion from the older settlements. (Adams, 25).
- Coates Hill**,—Q. See *Headline*.
- Cocagne**,—Kt. Former small Acadian settlement, apparently formed in 1755 by refugees from the expulsion at *Ruisseau des Malcontents* (opposite Cocagne Island), and at *Belair*, a few miles up the river. Its modern settlement begins in 1767, when 24 repatriated Acadian families (from St. Pierre and Miquelon, via Isle St. Jean) were assigned lands on the lower river and harbour, and thence to Shediac, granted them in 1772 (the first lands granted to any Acadians in the present New Brunswick) making it the oldest settlement in Kent. Later, between 1803 and 1812, several English speaking families, an expansion from Shediac, Sackville and Cumberland, settled above the Acadians on the river, originating the English settlement of that region which, however, is now being replaced by Acadians. (Gaudet, *Le Moniteur Acadien*, December 23, 27, 1887; Plessis, 183; Cooney, 154; Johnston, II, 62; Loc. inf.; Winslow Papers, 498).
- Cohoon**,—W. Recent Acadian settlement, an expansion apparently from Shediac. (Loc. inf.).
- Colborne**,—R. Parish est. 1839. Settled along Bay Chaleur, mostly by Scottish immigrants from the Island of Arran, subsequent to 1830, intermingled with a few Acadians from the *Ecl River* settlement at the west and with an earlier settlement at *New Mills*. Descendants of these settlers have extended somewhat to the backlands, on the modern Free Grant settlements, considered under their respective names. (Cooney, 204).
- Coldbrook**,—R. See *Colebrooke*.

- Colebrooke**,—R. Also Coldbrook. Acadian and native settlement, est. in or before 1843 and settled largely by Acadians from Gaspé and in part by native settlers. (Loc. inf.; Gesner, 204; Adams, 13).
- Colebrooke**,—V. A town laid out in 1842 at Grand Falls, but the name is practically obsolete. See *Grand Falls*.
- Colebrookdale**,—Kt. Native farming settlement, est. 1855, under the Labour Act and settled by expansion from neighbouring settlements, Irish and Scotch. (Adams, 23; C. L. R.).
- Collet Settlement**,—N. An extension of *Rogerville*.
- Collina**,—K. Loyalist expansion settlement, formed about 1810, by expansion from the *Belleisle*. (Loc. inf.).
- Commeau Ridge**,—V. and M. Acadian settlement, formed before 1879 under the Free Grants Act and settled by expansion from the river St. John. (Adams, 31).
- Coldstream**,—Cn. Native settlement, formed about 1826, by expansion from the St. John. (Ward, 73; C. R., which calls it a new settlement in 1827).
- Connell**,—Y. A tract laid out for settlement about 1856, but not occupied; now covered in part by *Alma* and *Nortondale*.
- Conosquamcook**,—C. Former Indian (Passamaquoddy) village, no doubt pre-historic, on the site of St. Andrews, in a charming and commanding situation in the midst of a rich salt water and shell fish fishery, and probably a council place. (Hist. Sites, 223; Acadiensis, II, 184).
- Conway**,—J. Former township in St. John and Kings, granted in 1765 to a company and partially settled by them. (Coll. N.B. Hist. Soc., I, 114, II, 28; Hist. Sites, 326, 333).
- Cookville**,—W. Native settlement, with some immigrants, an expansion from *Sackville*. (Loc. inf.).
- Coombes Road**,—M. Acadian settlement est. 1879 under the Free Grants Act, and settled by expansion from the St. John. (Loc. inf.).
- Cootes Hill**,—Q. See *Headline*.
- Cork**,—Y. Irish immigrant farming settlement, formed in 1841, beside the Fredericton-St. Andrews highway; formerly called Teetotal Settlement; *Acton* is an extension. (Johnston, N. A., II, 175; Report, 95, which gives full list of names).
- Cork**,—V. See *Gillespie*.
- Cormier Village**,—W. Also Kouchibouguac. Acadian expansion settlement formed between 1820 and 1830. (Loc. inf.).
- Cornhill**,—K. Native settlement, formed apparently after 1810, by expansion from the Loyalist settlements of *Smith's Creek*. (St. John Sun, July 27, 1892).
- Cornwall**,—Q. Settled first by Irish disbanded soldiers. (Loc. inf.).

Coverdale,—A. Parish est. 1828. Settled opposite Moncton by some of the Pennsylvania German settlers in 1765 (see *Hillsborough, Moncton*), and along the Petitcodiac by an expansion from the last mentioned settlements and from *Sackville* and *Cumberland*, with some disbanded soldiers from Fort Cumberland. Later the descendants of these settlers extended up *Turtle Creek* and *Little River*, and to the back lands. (Trueman, 220; Loc. inf.; *St. John Sun*, September 7, 1900).

Crocker Settlement,—N. Established 1876, on the I. C. Railroad, but not taken up.

Cross Creek Settlement,—Y. N.B. and N.S. Land Company settlement, formed soon after *Stanley* (about 1838) by English immigrants. (Loc. inf.).

Cumberland,—W. Now called *Westmorland*. Originally settled (as *Beauséjour*) by the French, who were all expelled in 1755. Later, a few disbanded soldiers settled near Fort Cumberland, but its modern settlement really begins when an association of families from New England settled here in 1761, receiving a grant of the township in 1763. Later, some immigrant families from Yorkshire, England, purchased lands and settled here. A few Loyalists arrived in 1783 and some immigrants from Great Britain and other sources later. With rich marsh lands, and, in recent years, good communication by railway, it has grown prosperously and expanded greatly to the other parts of the Province. (History by Trueman, in *The Chignecto Isthmus*; Hist. Sites, 328, 335.)

Curleyburg,—Y. N.B. and N.S. Land Company settlement, formed by immigrants from Great Britain. (Loc. inf.).

Dalhousie,—R. Parish est. 1839. Includes a Micmac village and an Acadian settlement at *Eel River*. Settled along the Restigouche by Scotch settlers prior to 1810, in part an expansion from the settlement above and in part new mostly Scotch settlers; and their descendants have expanded to the back lands.

The town of Dalhousie was laid out in 1826, at which time it had less than a dozen Scotch and French settlers, and it was made the shire town in 1837. As a shipping port for lumber it grew rapidly, reaching its culmination about 1850-56, and in recent years it has declined. (Herdman; Cooney, 208; *St. John Sun*, February 6, 1883; Johnston, N. A., I, 408, II, 3; Loc. inf.).

Damascus,—K. Native, formed about 1843 by expansion from neighbouring districts. (Loc. inf.).

Danish Settlement,—V. See *New Denmark*.

Darby Gillans,—S. Former post house on the old Nerepis road, established before 1826.

Dawsonvale,—R. Est. 1879 under the Free Grants Act. (C. L. R.).

Debec,—Cn. Small lumbering village, commenced about 1825 by native settlers, and a railway junction since 1869.

- Deer Island**,—C. First settled in 1770 by its owner, Capt. Ferrell, joined later by New England fishermen, members of the Owen Colony on Campobello, Loyalists and some later immigrants. In the midst of rich fisheries it has grown steadily to the present, its population segregating into distinct villages at the harbours. (History in the *Courier Series* by Vroom, XLII, CXXI-CXXIII; Lorimer, History of Islands, 89; *St. John Sun*, June 8, August 21, 1885; Hist. Sites, 323, 332; *Eastport Sentinel*, September 7, 1822).
- Derby**,—N. Parish est. 1859. Includes the site of the Acadian town of *Boieshébert*. Its modern settlement began in 1764, when John Davidson settled at Wilson's Point, and was later joined by other Scotch settlers. It was further settled in 1785 and later along the Miramichi by Scotch immigrants and expansion of the Loyalists from St. John (including some of the disbanded 42nd Highlanders from the Nashwaak), and in the interior by Irish immigrants.
- Dipper Harbour**,—J. Fishing village, settled by Loyalists in 1784. (Loc. inf.; C. L. R.).
- Doaktown**,—N. Early Scotch immigrant farming and lumbering settlement, formed about 1800 by families from Ayrshire, led by Robert Doak. Above the village a number of cellars, reputed French, occur; they are probably relics of a settlement formed after 1758 above reach of the English ships.
- Donegal**,—K. Irish immigrant, formed about 1841. (Loc. inf.)
- Dorchester**,—W. Parish est. 1787. Includes two sets of settlements, (1) the important Acadian settlements at *Fox Creek*, *Belliveau* and *Memramcook* (with its extension *Bonum Gould*), and (2) the English settlements at *Doer*, and on the lower Memramcook, especially about Dorchester Village. The latter includes settlers from a variety of sources, embracing Yorkshiresmen, disbanded soldiers from Fort Cumberland, New Englanders expanding from *Cumberland* and *Sackville*, Loyalists and later immigrants. The village of Dorchester was chosen as shire town, to replace *Westmorland*, in 1801. (Loc. inf.; C. L. R.; *St. John Sun*, August 3, 1904).
- Dorchester Road**,—W. Acadian farming settlement, formed about 1803, by settlers from Minudie, "who had been disturbed by their seigniors." (Plessis, 254).
- Dorn Ridge**,—Y. An N.B. and N.S. Land Company settlement, formed about 1860. (Loc. inf.).
- Dorrington Hill**,—Y. Native settlement, an expansion from St. John river. (Loc. inf.).
- Douglas**,—Y. Parish est. 1824. Settled along the St. John and lower Keswick in 1784-85 by disbanded Loyalist regiments, the Prince of Wales American Regiment (including a *French Location*), and the New York Volunteers. Later settlements were formed on the backlands by Irish and Welsh immigrants, notably Birdton, Cardigan, Tay, while after 1832 the remaining settlements, in part native and in part immigrant, were formed by the N.B. and N.S. Land Company. (History of the regiments by Raymond, Coll. N.B. Hist. Soc., II, 204, 209; locations in Hist. Sites, 342, 343 and Map 46).

- Douglastown**,—N. Early Scotch immigrant farming and mill village, settled originally by scattered Scotch immigrants, and later, probably prior to 1825, by Scotch from Dumfriesshire and parts of the Clyde; at first called Gretna Green. (Cooney, 108).
- Dover**,—W. Apparently an early expansion from Hillsborough, with Acadians above and below it.
- Dow Settlement**,—Cn. Native farming settlement, an expansion from the river St. John, formed prior to 1824. (Sketches of N. B.).
- Doyle**,—R. Native farming settlement, formed about 1840, by expansion from Jacquet river and vicinity. (Loc. inf.).
- Drummond**,—V. Parish est. 1872. Settled first along the St. John in 1819 by the disbanded regiment, The West India Rangers (see *Ranger Settlement*), and in the interior by Danish and by Irish immigrants, and by native expansion as considered under the respective settlements.
- Dufferin**,—C. Parish est. 1873. Settled originally in 1784, by a part of the Penobscot Association of Loyalists. At the height of the lumber industry of the St. Croix, 1830-1850, a considerable village grew up at The Ledge as a shipping port for lumber in sea-going vessels, but this trade has disappeared, and the village has nearly vanished. (Vroom, *Courier*, CVI; Loc. inf.).
- Dumbarton**,—C. Parish est. 1856. Apparently first settled about 1808 at Pleasant Ridge on the old Fredericton-St. Andrews road, and later along the Digdeguash and vicinity by expansion from the older settlements of Charlotte. The other settlements are of later immigrants, as considered under their respective names.
- Dumfries**,—G. Apparently Scotch immigrant, settled with Dunlop about 1841. (C. L. R.).
- Dumfries**,—Y. Parish est. 1833. Settled in part along the St. John, in 1784, by disbanded Loyalist regiments, The King's American Dragoons, and a part of the King's American Regiment, and by various native settlers at the *Barony*. (History of these regiments by Raymond, in Coll. N.B. Hist. Soc., II, 203,211; locations in Hist. Sites, 343 and Map 46).
- Dundas**,—Kt. Parish est. 1826. Includes the important old (1767) Acadian settlements from *Grandique* to *Cocagne* and thence northward to *Buc-touche*, the early native expansion settlements on the *Cocagne* river, and the early Scotch immigrant settlements considered under their respective names.
- Dundee**,—R. Native settlement formed by expansion of the Scotch settlements along the Restigouche prior to 1849. (Johnston, N. A., I, 409).
- Dunlop**,—G. Scotch immigrant, formed about 1841. (C. L. R.).
- Dunlop**,—S. A temporary name for the settlement north of Geary.
- Dunnville**,—Kt. Est. 1899, under the Free Grants Act.

- Durham,—R.** Parish est. 1839. Settled first in 1790 at *Jacquet River*, and along the coast of Bay Chaleur, after 1830, chiefly by Scotch immigrants from the Island of Arran. The settlements on the backlands are expansions from these, in part recent Free Grants settlements, as noted under their respective names. (Cooney, 203).
- Durham,—Y.** Native settlement, laid out about 1860 as the "Wesleyan Tract," and settled under the Labour Act by expansion from neighbouring settlements. (C. L. R.).
- Dutch Valley,—K.** Loyalist settlement, formed soon after 1786 by disbanded soldiers from New Jersey, probably a part of the fourth battalion of the New Jersey Volunteers, which was temporarily assigned lands here. (History of this regiment by Raymond, in Coll. N.B. Hist. Soc., II, 209).
- East Scotch Settlement,—K.** Scotch immigrant settlement, formed about 1823, by families from Perthshire. (Loc. inf.).
- Edmundston,—M.** Earlier called Petit Sault, or Little Falls. Modern lumbering and railway town. Apparently settled first on the east side of the Madawaska about 1821 by Simon Hebert, and on the site of the present town about 1840; it became of considerable importance on the building of the Block House in connection with the boundary disputes in 1842, grew slowly with the development of the lumber trade until the completion of the railroad to Fredericton in 1876, since which it has grown steadily to the present. Shiretown of the county since 1873. (C. R., Alexander, L'Acadie, II, 64. Its first English settler appears to have been John Hartt, who settled on the Indian land south of the Madawaska in 1840, on whom there is interesting material in the Select Committee Report, 77.)
- Eel Ground,—N.** Important (Micmac) Indian reserve of 2,682 acres, established Jan. 10, 1789, and now including an important permanent village, (Perley, Ind., XCVIII, CX).
- Eel River,—R.** Acadian settlement of unknown date and mode of origin; it was in existence in 1812, and grants were made in 1822. (Plessis, C. L. R.; Cooney, 205; Winslow Papers, 501). The French have gradually mixed with the Scotch and other settlers in the vicinity.
- Eel River,—R.** Small Indian (Micmac) reserve of 220 acres, with a permanent village. (Perley, Ind., CIII).
- Eel River,—Kt.** Established recently under the Free Grants Act.
- Eel River,—N.** Recent Acadian farming settlement, formed 1879 under the Free Grants Act by expansion from Kent. (Adams, 20; loc. inf.).
- Eel River,—Y. and C.** Settled entirely by native expansion from the St John river and from St. John city, as noted under the respective settlements.
- Eldon,—R.** Parish est. 1826 (united with Addington 1876, but restored 1896); settled only along the Restigouche and a few miles up the Upsalquitch by native settlers, an expansion from the lower *Restigouche*. (Loc. inf.).

- Elgin**,—A. Parish est. 1847. Settled along Coverdale and Pollet rivers by expansion from the Petitecodiac Valley, with a few immigrants after 1810, and along the Kennebecasis from lower on that river about 1820, and in the southern part by native expansion from St. John, as noted under names of the various settlements. (Ms. History of the Parish by W. A. Colpitts of Mapleton; Trueman, 220; *St. John Sun*, September 7, 1900).
- Elgin Corner**,—A. Native farming settlement, formed in 1811 by John Geldart, later joined by other settlers, an expansion from *Coverdale* and the *Petitecodiac*. (Loc. inf.; *St. John Sun*, September 7, 1900; Trueman, Chignecto Isthmus, 220; C. L. R.).
- Ellenstown**,—N. Irish immigrant (Methodist) settlement, formed not long prior to 1832; formerly called Williamstown. (Cooney, 120; Gesner, 194, by a mis-print, calls them Welsh).
- Elm Tree River**,—G. Est. 1901 under the Free Grants Act.
- Emenetic**,—K. Early French winter-village on Catons Island, occupied in 1612 by sailors from France. (Jesuit Relations, II, 27; Hist. Sites, 268; Raymond, *St. John River*, 20).
- Emerson's Creek**,—J. Assigned to disbanded Loyalist soldiers in 1784, but probably settled later by immigrants. (C. L. R.; loc. inf.).
- Emigrant Settlement**,—W. Irish immigrant farming settlement, formed in 1835-36. (Johnston, N. A. II, 71; fuller account by Botsford in *Sackville Post*, January, 1886; Trueman, 51).
- Emigrant Settlement**,—J. Irish immigrant farming settlement, formed 1818 or 1819, along the Upper Quaco Road, later largely abandoned. (C. L. R.; loc. inf.).
- Emigrant Settlement**,—S. Recent Irish immigrant farming settlement, est. about 1860. (Loc. inf.).
- Enault**,—G. See *Nepisiguit*.
- English Settlement**,—Q. Early English immigrant settlement, formed in 1819 by eleven families, probably from Yorkshire; one of the most important of the early immigrant settlements. (Johnston, Report, 84; practical information to Emigrants, 79; in this settlement, prior to 1845, lived Mrs. Beaven, who published in that year in London her "Sketches and Tales illustrative of Life in the Back Woods of New Brunswick," a very valuable little work on the customs of New Brunswick country life at that time).
- English Settlement**,—Y. Formerly called Lime Kiln. One of the N.B. and N.S. Land Company settlements, formed 1836 by English immigrants from Northumberland. (Loc. inf.).
- Ennishone**,—V. Also Innishowen. Irish immigrant settlement, formed in 1861 (surveyed 1857), mostly from Cork; now being occupied by many French. (Loc. inf.).
- Enniskillen**,—Q. Irish immigrant, formed prior to 1826; apparently at first called Adair Settlement. (C. L. R.).

- Escuminac**,—N. Early Acadian and English farming, fishing and pilotage settlement, formed apparently by expansion from the Acadian village of Lower Bay du Vin and from the native settlements of Cumberland, N.S. (Loc. inf.).
- Fairfield**,—J. Native, formed about 1820 by expansion of Loyalist settlers of Quaco. (Loc. inf.).
- Fairville**,—J. Modern mill (steam) village, attracting settlers from various sources, formed amid earlier Loyalist grants.
- Ferriebank**,—C. Native settlement, laid out in 1860 under the Labour Act and apparently settled sparsely and temporarily, by expansion from St. John under the auspices of Rev. Mr. Ferrie, Free Baptist clergyman. (Loc. inf.).
- Filomaro Settlement**,—K. Properly Philmonro. Apparently an Irish immigrant settlement of 1830 or later. (Loc. inf.).
- Florenceville**,—Cn. Originally Buttermilk Brook, Settled by expansion from the lower St. John about 1832. (Raymond, Carleton County, 75).
- Flume Ridge**,—C. Irish immigrant farming settlement, formed about 1845. (Loc. inf.; Gesner, 163).
- Ford's Mills**,—Kt. Irish immigrant mill village, est. before 1832. (Cooney, 149; Johnston, N.A., II, 56).
- Forest City**,—Y. A small mill village, former centre of the tanbark industry, with settlers from various sources, but now in decline.
- Foreston**,—Cn. An extension of *Glassville*.
- Fort Folly**,—W. Small Indian (Miacmac) reserve (of 62½ acres), purchased for the Indians August 15, 1840, to replace a former settlement near Dorchester; a small permanent village. (Perley, Ind., CV).
- Four Falls**,—V. Mill village, formed prior to 1849, attracting settlers from diverse sources; but the venture proving a failure, these settlers took up lands near the American boundary to the northward. (Loc. inf.).
- Fourche a Crapaud**,—A. Former small Acadian settlement at the Forks of Turtle Creek, probably formed by refugee Acadians above reach of the English ships after the destruction of their villages in 1758. (Hist. Sites, 282; Cockburn, Report, 42).
- Fox Creek**,—W. Also Ruisseau des Renards. Important Acadian settlement founded, on the repatriation in 1767 or 1768, on the site of the pre-expulsion settlement (see *Petitcodiac*). These settlers—returned from St. Pierre and Miquelon, received grants about 1806. This settlement, with Memramcook and possibly Belliveau, are the only ones in all Acadia now occupied by Acadians on lands possessed by them before the expulsion. (History by Gaudet, in *Le Moniteur Acadien*, December 3, 1897).
- Francfort**,—Y. Former township of the English period, also called MacNutt's, granted in 1765 to a company, but not settled by them. (Hist. Sites, 333; Coll. N. B. Hist. Soc. I, 110).
- Frederick, Fort**,—J. See *Old Fort*.

Fredericksburg,—Y. N.B. and N.S. Land Company settlement, formed by settlers from Scotland. (Loc. inf.).

Fredericton,—Y. Loyalist city, founded in 1785, as the capital of the province, on the site of the Acadian village of *St. Annes*. The situation was chosen primarily because it was the most nearly central position on navigable waters. Est. as a town in 1786, incorporated as a city in 1848, now the second city in the province. The shire town of York since 1786. (History not yet properly written, but a valuable series of 20 articles by W. G. Macfarlane appeared in the *St. John Sun*, in 1892).

Fredericton Road,—W. Formerly called Albert. Irish immigrant settlement, formed after 1843 on a projected highway from Moncton to Fredericton. (*Botsford, Chignecto Post*, January, 1886; C. L. R.).

French Bay,—N. Or Lower Bay du Vin. See *Baie des Oujes*.

French Fort Cove,—N. Early French battery on the west entrance, doubtless built about 1755 for the protection of *Boishébert*. (Hist. Sites, 295).

French Lake,—S. (Oromocto). Former small Acadian farming settlement, probably founded by refugee Acadians out of reach of the English ships after Monckton's expedition in 1758. (Loc. inf.; Hist. Sites, 272).

French Lake,—S. (East of St. John). Origin and history probably as for the preceding.

French Location,—Y. Former small Acadian village below the mouth of the Keswick, granted them at the same time the grants were made to Loyalist settlers in *Douglas*; they soon sold their lands and their later history is unknown. (Hist. Sites, 270; Raymond, in Canadian History Readings, 283, 341).

French Location,—V. In 1814 a grant was made to ten Acadian families in the angle between the Aroostook and St. John, but they never settled there and, doubtless, immediately sold their lands and went to Madawaska. (C. L. R.).

French Village,—K. Former Acadian village of some 15 families, formed apparently on the repatriation about 1767 or 1768; they received grants of their lands in 1787, but soon after sold them to the English and removed to Madawaska. (Hist. Sites, 272; C. L. R.; Raymond, in Canadian History Readings, 283).

French Village, Lower,—Y. Acadian settlement, founded probably by the Acadians of *St. Annes*, after the destruction of their settlement by the English in 1759; for reasons unknown they were not obliged to retire to Madawaska after 1786, but they remained here and received grants of land which are still in possession of their almost entirely Anglicized descendants. An expansion of this settlement was formed in the *Mysh-rall settlement*, back from the river. (Loc. inf.; Hist. Sites, 269; C. L. R.).

French Village, Upper,—Y. Acadian village with a history like that of the preceding, but smaller than the latter.

- Freneuse**,—S. Early French seigniorial settlement in Maugerville, opposite the Oromocto, founded about 1684; later the most important seigniorial establishment on the St. John, and apparently abandoned after 1700. (Hist. Sites, 171, 312; *Acadiensis*, I, 121, which gives an important descriptive lease).
- Fronsac**,—N. Early seigniorial settlement and fortified trading post, founded about 1685 by Richard Denys de Fronsac, on the north shore of Miramichi Bay, probably at or near *Burnt Church*; later fate unknown. (Hist. Sites, 292, 317; Canadian History Readings, 271; Le Clercq. Gaspésie, as cited in preceding; St. Valier *Estat présent de l'Eglise*, Paris, 1683, page 32 of the Quebec 1856 edition).
- Gagetown**,—Q. Early township in Queens, granted in 1765 to a company, but only partially settled by them and afterwards escheated. (Hist. Sites, 326, 333; Coll. N.B. Hist. Soc., I, 100); its pre-Loyalist settlers, some 37 families, were partly New Englanders, partly from Great Britain, and partly from exposed settlements plundered by privateers in Nova Scotia. It was established as a parish in 1786, and was settled along the St. John in 1784, and later, by Loyalists; while in the interior it is occupied by later immigrant settlements, as noted under their respective names.
- Gagetown Village**. On the site of the Acadian village of *Grimross*; was settled scantily in the English period, but chiefly by Loyalists in 1784 and later. It has been the shire town of Queens since 1786.
- Galloway**,—Kt. Also New Galloway, and (erroneously) Galway. Early Scotch immigrant settlement, formed in 1820 or 1821, on the Richibucto-Buctouche highway road by some 18 families from Wigton and Kirkcudbright. Long a flourishing Scotch settlement, it is now being largely occupied by Acadians. (Johnston, N. A. II, 60, and Report, 85; Cooney, 152; S. P. G. Report for 1825; Trueman, 50; C. R.).
- Gardner's Creek**,—J. Assigned originally in 1784 to disbanded Loyalist settlers, but apparently settled later by various immigrants. (Loc. inf.).
- Garnet**,—J. Early native expansion settlement.
- Gary**,—S. Old form of *Geary*.
- Gaspereau, Fort**,—W. Former French fort, built 1751 on a well-known site south of the mouth of the Gaspereau river, to protect the communication between the Chignecto region and Quebec and Louisburg. (Hist. Sites, 289; a full account of the fort is in E. T. P. Shewen's "Notes of Fort Monckton," St. John, 1892, 10 pp.).
- Gaspereau**,—Q. Farming and lumbering settlement along this river, settled about 1828 by some Scotch immigrant and native settlers. (Loc. inf.).
- Geary**,—S. Early Loyalist expansion settlement, formed about 1806 (granted 1810), by some 9 families of Loyalists who came to New Brunswick by way of Niagara; one of the earliest settlements formed in New Brunswick away from navigable waters. (Loc. inf.; C. L. R.).

Germantown,—A. Former temporary farming settlement, formed in 1765 or 1766, about the mouth of German Creek by Pennsylvania Germans, tenants of the company which received the grant of Hopewell township in 1765. After disputes with the proprietors the tenants appear to have obtained their lands by suits at law against the latter, but their subsequent history is unknown. It is locally said they joined their fellow-countrymen at Hillsborough, but this is doubtful. (Hist. Sites, 328, 335; important references in Canadian Archives, 1886, 488-492; *Maple Leaf*, Albert Co. newspaper, August and September, 1886).

The modern Germantown was settled about 1800, in common with other parts of this region, by native settlers from Nova Scotia.

Giants Glen,—Y. N.B. and N.S. Land Company settlement formed about 1850 by immigrants from Great Britain. (Loc. inf.).

Gibson,—Y. Modern railway village which has grown up on the site of the earlier Monckton.

Gillespie,—V. Also Cork. Irish immigrant farming settlement, formed about 1845. (Johnston, N. A., I, 63).

Girouard,—Kt. Acadian and native settlement, established 1872, under the Free Grants Act and settled by expansion from various neighbouring sources. (Adams, 22).

Girvan Settlement,—Kt. Irish immigrant; probably a part of the old Irish settlement on Coal Brook mentioned by Johnston, II, 56.

Gladstone,—S. Parish est. 1874. Settled first along the Oromocto up to the Forks in 1784-85 by Loyalists, and along the North Branch, as well as along the old Fredericton and St. Andrews road crossing at Tracy, by Loyalist expansion from 1800 to 1810. The interior mostly still unsettled. (C. L. R.).

Glasiers Manor,—K. Large estate at the mouth of Nerepis, granted in 1765 to B. P. Glasier, who afterwards sold to Colonel Coffin, who named it *Alwington*. (Hist. Sites, 333).

Glassville,—Cn. Important Scotch immigrant farming settlement, formed in 1860 and 1861 under the Labour Act by some 30 families from Aberdeen, brought out under the auspices of Rev. Charles Gordon Glass, a Presbyterian minister, and apparently joined later by some other immigrants and native settlers. (Stevenson's Report for 1872, 31; loc. inf.; Select Committee Report, 90, 92).

Glencoe,—Y. Native settlement formed in 1862 by expansion from the settlements of the Nashwaak, chiefly descendants of the men of the 42nd Highlanders. (Loc. inf.).

Glenelg,—Kt. Former name for the Scotch settlement at *Black River*, Kt.

Glenelg,—N. Parish est. 1814. Settled originally about 1790 by disbanded Scotch soldiers at *Black River*, and after 1820 by Scotch on *Napan*, and later by native expansion and Irish immigrant (*Upper Bay du Vin*) settlers along the Chatham-Richibucto highway.

Golden Groove,—J. Earlier Marks Settlement. Native expansion, formed before 1819.

Golden Mountain,—A. Common corruption for *Gowland Mountain*.

Golden Ridge,—Cn. The post-office for *Skedaddle Ridge*.

Golden Ridge,—Y. Settled in 1863 by "Skedaddlers" from the United States, who came here to escape the draft into the Union armies. (Loc. inf.).

Goods Corner,—Cn. Settled about 1843 by three brothers of that name. (W. O. Raymond Ms.).

Gooldsborough,—S. Former large estate granted 1767 to Arthur Goold in *Lincoln*, and settled by New Englanders and Loyalists under his grant. (Hist. Sites, 334; Coll. N.B. Hist. Soc., II, 158).

Gordon,—V. Parish est. 1863. Settled entirely by native expansion along the *Tobique River* from the St. John and other parts of N. B.

Gordon,—S. Former name of a settlement near *Shirley* (perhaps *Greenfield*). (Gesner, 153; Ward, 31).

Gordon Vale,—Y. N.B. and N.S. Land Company settlement, formed about 1875 or earlier, by natives of New Brunswick.

Goshen,—A. Native settlement, formed about 1830 by expansion from the Lower Kennebecasis. (Loc. inf.)

Goshen,—K. Immigrant settlement, formed about 1827, by settlers from Nova Scotia and Ireland. (Loc. inf.).

Gowland Mountain,—A. English immigrant settlement, formed in 1829 or later by George Gowland and family, later joined by others. (Loc. inf.; Johnston, Report, 84).

Graham's Corner,—Y. Settled about 1862, probably by expansion from the St. John. (Loc. inf.).

Grande Anse,—G. Acadian farming and fishing settlement, formed about 1810 (grants in 1816), apparently an expansion of Caraqueet. (Johnston, N. A., II, 18).

Grand Falls,—V. Temporary French post in 1756, but its modern settlement begins with the establishment here of a military post in 1791 by Governor Carleton, since which time it has grown slowly to the present. Extensive mills were planned here in 1832 by Sir John Coldell, and in 1842 it was laid out as a town under the name *Colebrooke*, while in 1896 it was incorporated. It was the shire town of Victoria from 1844 to 1876. (Apparently nothing of consequence has been written on its history; Rameau, II, 374; Alexander, L'Acadie, II, 71; Johnston, N. A., I, 65).

The parish was established 1852. It was settled along the river, mostly by native settlers from various sources, apparently after 1827, and in the interior sparingly by their expansion, with a few immigrants.

Grandigue,—Kt. Part of the original settlement of Acadians at *Shediac*.

Grand Lake,—Q. Settled around its entire shores in 1784-1786 by Loyalists. (C. L. R.).

- Grand Manan**,—C. Early temporary settlement of New Englanders soon abandoned (Hist. Sites, 325). Its modern settlement begins in 1783, when Moses Gerrish with a few other Loyalist families settled near Grand Harbour, where they were later joined by various immigrants from the United States. These settlers and their descendants, joined by others from the United States, have formed the prosperous fishing settlements on that island. Parish in 1816. (History by Howe in Coll. N.B. Hist. Soc., I, 341; important matter by Lorimer, History of Islands, 11; Winslow Papers, 490; valuable Ms. Notes of 1803 by McDonald in Crown Land Office).
- Grande Plaine**,—G. Former early French settlement, in the early seventeenth century, at the extreme north of Miscou for the capture of the sea-cow (walrus) there very abundant. (Perley, Fisheries, 33; Hist. Sites, 296).
- Grand River**,—M. Acadian farming and lumbering settlement, established after 1853 (survey that year) by expansion from the St. John. (Loc. inf.; C. L. R.).
- Greenfield**,—Cn. Native expansion farming settlement, formed about 1827 by expansion from the St. John. (C. L. R.; Ward, 71).
- Green Hill**,—Y. N.B. and N.S. Land Company settlement, an extension of Cross Creek. (Loc. inf.).
- Green Point**,—G. Acadian settlement, an expansion from *Pokemouche* about 1830 and later. (Loc. inf.).
- Green Point Settlement**,—Y. Formed about 1868 by men who had worked on construction of the railway, now mostly abandoned. (Loc. inf.).
- Greenville**,—Cn. Settled about 1840 by expansion from Keswick. (Loc. inf.).
- Greenwich**,—K. Parish est. 1795. Settled along the St. John in 1785 by Loyalists, who, from Oak Point to Queens purchased their lands from *Kem-ble's Manor*, and whose descendants have expanded to the backlands.
- Grimross**,—Q. Former important Acadian village on the site of Gagetown and vicinity; founded by Acadian refugees from Beauséjour after 1755, and abandoned after its destruction by Monckton in 1758. (Hist. Sites, 271; Coll. N.B. Hist. Soc., II, 170, 175).
- Gueguen**,—Kt. Acadian, an early expansion from *Cocagne*.
- Hammond**,—K. Parish est. 1858. Settled along the upper course of Hammond river, probably after 1810, by expansion of Loyalist settlements from the river below, and along the Shepody road by later, chiefly Irish, immigrants, as noted under the names of the settlements.
- Hammond River**,—K. Settled first at *French Village* by Acadians about 1767, and later along its lower course by Loyalists in 1784-86, and along its upper course by expansion of their descendants. (Winslow Papers, 494).
- Hampstead**,—Q. Parish est. 1786; settled by Loyalists in 1784-85 along the St. John (below Long Island, by purchase from *Kemble Manor*), and by later immigrants in the interior, with a negro settlement at *Otnabog*.

Hampton,—K. Parish est. 1795; settled along the Kennebecasis and Hammond River by Loyalists in 1784-85, and by expansion of their descendants on the uplands.

Hampton Station, formerly Ossekeag, est. 1858 and made the shire town in 1871. (*St. John Sun*, August 6, 1904).

Hampton Ferry,—K. Thriving mill village, formed among Loyalist settlements at the crossing of the Kennebecasis by the old Westmorland and Fredericton roads. Gesner (N.B., 149) speaks of it as formed not long before 1847.

Hamtown,—Y. An early (before 1820) settlement, apparently Irish immigrant, later occupied by expansion from the Welsh settlement *Cardigan*. (Loc. inf.; C. R.).

Hanwell,—Y. Irish immigrant farming settlement, formed before 1825 (on poor land) on the Fredericton-St. Andrews road, by some 20 families, probably brought out under the auspices of Hon. Thomas Baillie. (Loc. inf.; C. R.).

Harcourt,—Kt. Parish est. 1826. Settled originally along Salmon river by an expansion of mixed native and immigrant settlers from the river below, and later, after 1876, along the I. C. Railroad, especially at Adamsville and Harcourt station by native settlers from various sources. (Loc. inf.).

I. C. Railway station, earlier called *Weldford*, a flourishing village, near the intersection of the R.R. and the Richibucto-Grand Lake road, settled chiefly by English-speaking settlers from Weldford parish, with some Acadians.

Hardingville,—J. Native expansion settlement, formed about 1830, with some later immigrants, principally Irish. (Loc. inf.).

Hardwicke,—N. Parish est. 1851. Includes the early Acadian *Baie des Oujes*. Its modern settlement begins with the Acadian settlement of Lower Bay du Vin, perhaps dating from 1761. Settled about 1786 by some Loyalists along Vin Harbour and about 1790 by disbanded Highlanders near *Black River*; in the interior settled by expansion from these settlements.

Hardwood Island,—C. Used as a hospital island in 1848, for the victims of a fever ship in that year which brought out some 200 immigrants from Earl Fitzwilliam's Wicklow (Irish) estates to work on the St. Andrews and Quebec Railway. (Newspaper item).

Hartin Settlement,—Y. Formed about 1865 by Rev. Thomas Hartin, and settled presumably by native Episcopalians from different parts of the Province. (Loc. inf.).

Hartland,—Cn. Flourishing railway station at junction of C. P. Railway with the Becaguimec valley. First settled in 1790 on the site of an Indian village by William Orser, a Loyalist from the lower St. John, joined later by others. (History in *Hartland Advertiser*, July 2, 1897).

Hartt's Mills,—S. Small mill village at falls of the Oromocto, formed before 1800 by expansion of Loyalist settlements lower on the Oromocto. A block house was erected here in 1785 and another in 1813. (Hist. Sites, 347).

Harvey,—A. Parish est. 1838; included originally a part of the Acadian settlement of *Shepody*; but its modern settlement begins with some tenants of the original grantees (Burbridge and Best, 1763-65) along the lower Shepody river, who were joined later by settlers from older parts of Westmorland and a few others. Later, especially after 1790, many native settlers from Nova Scotia took up lands all along the coast and on Germantown Lake, as noted under the special settlements. (Loc. inf.; C. L. R.).

Harvey,—Y. Important English and Scotch immigrant settlement, formed in 1837 by some 30 families (joined by others later) from the border country between England and Scotland, especially Tweedbank and Wooler. Established on the Fredericton-St. Andrews highway road, it has, after some early hardships, prospered down to the present, and it is now one of the best inland settlements of New Brunswick. It has expanded to Tweedside, Wooler, Little Settlement, Goss Settlement, and Harvey or York Mills. (There are numerous references to the foundation and progress of this settlement; Johnston, N. A., II, 169, 172, and Report 93, giving names of all heads of families; Ward, 46, 92; Brown, Prize Essay, 12).

Havelock,—K. Parish est. 1858; first settled about 1810 at Butternut Ridge by expansion from *New Canaan*; settled about the same time on *Smith's Creek*, and later on upper *Studholm's Millstream* by expansion of Loyalist settlers and their descendants up those streams, with some later immigrant settlements, noted under their respective names. (Loc. inf.).

Haynesville,—Y. N.B. and N.S. Land Company settlement, formed about 1850 by native settlers from the Keswick and neighbouring settlements. (Loc. inf.)

Hayesville,—N. Formed about 1829 by Irish immigrants and native settlers. (Loc. inf.).

Hazelton,—N. Modern settlement, established before 1879 under the Free Grants Act, and sparingly settled by expansion from neighbouring settlements. (Adams, 20).

Headline,—Q. Irish (Protestant) immigrant settlement, formed in 1829. Originally called *Cootes (Coates) Hill*. (Johnston, Report, 84; S. P. G. Report, 1836; Trueman, Chignecto Isthmus, 199).

Heatonville,—Q. Early estate in *Cambridge* granted J. S. Heaton in 1774, but later settled by New Englanders and Loyalists. (Hist. Sites, 334).

Hellerup,—V. Temporary name for *New Denmark*.

Henderson Settlement,—Q. Irish immigrant farming settlement, formed about 1820 by families from the north of Ireland. (Ward, 23; loc. inf.).

Hibernia,—J. Irish immigrant settlement, formed about 1830 on the lower Quaco road. (Loc. inf.).

Hibernia,—Q. Formerly New Ireland. Native expansion and Irish immigrant settlement, formed about 1810. (Loc. inf.).

Hibernia Settlement,—Q. Former name for *Salmon Creek* settlement.

Hillsborough,—A. Former township, granted in 1765 to a company, which, in its attempt to settle it, brought here as tenants Heinrich Steeves and family of six sons, Pennsylvania Germans. According to tradition these first settlers were landed at Hillsborough in 1765 at the same time the other Pennsylvania Germans were landed at Moncton, but an important document of 1788 (in the *Moncton Transcript*, December 21, 1901) seems to show they resided first for some years at Moncton and came here later. They settled at Hillsborough village, and obtained possession of these lands by suits at law against the proprietors about 1780. They were gradually joined by other Germans from *Moncton* (and possibly from *Germantown* in *Hopewell*), by the tenants of one Major Gray, who appears to have held the rights of one or more of the grantees, by disbanded soldiers from Fort Cumberland, and by settlers expanding from Sackville and Westmorland, all of whom gradually took up the lands along the coast and expanded early in the nineteenth century to the back lands, as noted under the respective settlements. It was made a parish in 1786.

Hillsborough village, earlier known as the Dutch Village and the Lower Village, on the site of an earlier Acadian village (see *Petitcodiac*), has grown prosperously in part as a farming and distributing centre, and more recently as a shipping port for plaster (gypsum), which occurs near by in large quantities.

(Ms. History by Steeves; Botsford in *Chignecto Post*, January 14, 1886; Hist. Sites, 328, 335; St. John *Sun*, March 27, 1883, and September 7, 1900, and July 13, 1904).

Hopewell,—A. Former township, including the old Acadian settlements of *Shepody*, granted in 1765 to a company which in that year or the next introduced Pennsylvania German settlers (at *Germantown*), who, however, later removed. It was made a parish in 1786, and the lands along the Shepody and the coast were granted in 1787-1788, and settled soon after, chiefly by expansion from the older parts of Nova Scotia and Westmorland, by descendants of the old New England settlers and by North of Ireland settlers of Colchester County with a few later immigrants and occasional settlers from other sources, but with few or no Loyalists. The descendants of these settlers, with some new arrivals from Nova Scotia, have expanded to form the settlements of the backlands, as noted under their respective names. (Loc. inf.; see references under *Shepody*). There is a local tradition that some of the American privateersmen who helped to plunder the *Petitcodiac* settlements in 1776 and later, afterwards settled in this parish. It became the shire town of Albert County in 1845.

Hopewell Cape,—A. History similar to *Hopewell Hill*.

Hopewell Hill,—A. Prosperous farming settlement besides great salt marshes, formed about 1787 by native settlers from older parts of Nova Scotia. (Loc. inf.).

- Howard Settlement**,—Y. Now called *Canterbury Station*. Early combined native expansion and immigrant (Irish) settlement formed about 1825 by expansion from the St. John river. (Ward, 65; Johnston, N. A., I, 49; Gesner, 170).
- Howardville**,—N. Former town laid out at the mouth of *Cains River* in 1825, and occupied in part by Irish immigrants. With some business as a lumbering centre it had 22 houses in 1832 (Cooney, 121), but it has since become simply a farming settlement. (History in *Chatham Advance*, early in March, 1897).
- Howe, Fort**,—J. Erected in 1778 to help protect the St. John river settlements from privateers during the Revolution, and dismantled soon after. (Hist. Sites, 327).
- Howland Ridge**,—Y. N.B. and N.S. Land Company settlement, formed about 1875, apparently by expansion from older settlements. (Loc. inf.)
- Hughes, Fort**,—S. Block house, built in 1780 at the mouth of *Oromocto* as a protection against possible Indian attacks and, perhaps, from possible invasion by the old portage route of the *Oromocto*, but soon abandoned. (Hist. Sites, 327).
- Huskisson**,—Kt. Parish est. 1826. A parish apparently entirely without inhabitants.
- Indian House**,—J. See *Indiantown*.
- Indian Island**,—C. Prosperous fishing settlement, originally settled by the French as *La Treille*. Its permanent settlement begins in 1763 with the settlement here of New England fishermen and traders. (History by Vroom in *Courier*, XXXVII, XXXVIII; Lorimer, History of Islands, 73; Coll N.B. Hist. Soc., I, 162; Hist. Sites, 323, 332).
- Indian Island**,—G. Small Indian reserve (Micmac) of 16 acres, purchased for the Indians November 26, 1895, and with a small permanent settlement.
- Indian Island**,—Kt. Small Indian reserve, not the property of the Government, but of the Roman Catholic Bishop of St. John. (Rept. Department of Indian Affairs, 1901).
- Indian Mountain**,—W. Native farming settlement, apparently an expansion from *Lutz Mountain* about 1840. (Loc. inf.).
- Indian Point**,—N. Small (Micmac) Indian reserve of 100 acres, opposite Red Bank, established March 5, 1805, with 750 acres; not occupied. (Perley, Ind., CX).
- Indiantown**,—J. Early trading post, est. in 1779 as the "Indian House," for trade with the Indians. Its position above the falls at the mouth of the St. John makes it the natural port for river traffic, and a settlement here has increased steadily to the present. (Hist. Sites, 326). In 1786 a part of Portland, and since 1889 a part of St. John.
- Indiantown**,—N. Modern village, probably on the site of an Indian settlement, and apparently formed after 1800 by settlers from various sources.

- Indian Village**,—Y. (By the Indians, Seedansis,—Little St. Annes). Indian (Maliseet) reserve, and important permanent village, formed in 1794 when the Indians bought nine acres of land here after the sale of Aucpac; in 1816 the New Brunswick Government bought 300 acres in addition for them.
- Indian Village**,—Y. (St. Marys). Small Indian (Maliseet) reserve, of 2½ acres, purchased June 20, 1867, for the Indians; an important permanent village. They had apparently settled on this location many years before, but without any right to the land.
- Inkerman**,—G. Parish est. 1855. Settled originally at lower *Pokmouche* by Acadians, and later by Irish immigrants. Acadian settlements have extended up the river and to *Pacquetville*.
- Innishannon**,—G. A part or extension of *New Bandon*.
- Irish Settlement**,—Q. Irish immigrant farming settlement, formed in or before 1824, and earlier called *Waterloo Settlement*. (C. R.; Ward, 21).
- Irish Settlement**,—Cn. A small settlement of Irish immigrants among the native settlers, 3 miles southwest of Richmond Corner, formed in 1819. (Raymond, Carleton County, 75; loc. inf.).
- Irishtown**,—J. Irish immigrant settlement, formed in 1824. (Loc. inf.).
- Irishtown**,—W. Early Irish immigrant settlement, formed in 1821. (C. R.). Botsford, in *Sackville Post*, January, 1886, though the date he gives, 1812, is too early).
- Irving Settlement**,—A. Native, an expansion about 1815 (?) from Hillsborough. (Loc. inf.).
- Isle St. Croix**,—See *St. Croix, Isle*.
- Ivanhoe**,—J. See *Musquash Village*.
- Iveys Corner**,—Cn. Settled about 1834 by George Ivey, from Plymouth, England, soon joined by others. (Loc. inf.).
- Jacksontown**,—Cn. Important early native settlement, formed about 1810 by John Jackson, from Woodstock, on the site of the present Jacksonville. He was later joined by other native settlers, descendants of Loyalists and New Englanders, from the lower St. John. This appears to be the first settlement back from the St. John, in Carleton County. It later expanded rapidly, and about 1850 the post-office of its lower part was named Jacksonville. (Manuscript history of Jacksontown, by E. Murray Burt, also published in the *Woodstock Dispatch*; Raymond, Carleton County, No. 75; *St. John Telegraph*, September 27, 1887).
- Jacksonville**,—Cn. See the preceding.
- Jacquet River**,—R. First settled in 1790 by James Doyle, a disbanded British soldier, joined by later settlers from Scotland. A few Acadians were apparently settled here in 1811, including one Firlotte, with one Violette at *River Louison*. (Cooney, 203; Plessis, 118; loc. inf.; Winslow Papers, 501).
- Janeville**,—G. Village mostly settled by Irish of *New Bandon* and *Salmon Beach*. (Loc. inf.).

Jemseg,—Q. Former fortified trading post on the east side of the mouth of the Jemseg, founded apparently in 1659, by Temple, occupied after 1672 by Sieur de Soulanges, and in 1690-92 by Villebon as the temporary capital of Acadia; in 1696 it was in possession of Sieur de Chaffours; later in 1758 there appears to have been an Acadian village here. It fell within *Spryhampton* in 1774, and was settled temporarily by tenants of William Spry, but was permanently occupied by Loyalists after 1784. (Hist. Sites, 271, 274, 311; loc. inf.).

Jerusalem,—Q. See *New Jerusalem*.

Johnsonville,—Kt. Est. 1903 under the Free Grants Act. (C. L. R.).

Johnston,—Q. Parish est. 1839. Settled along the Washademoac in 1784, by Loyalists to Cole's Island, and by their extension later (1800-1810) up the Canaan river and up Long's Creek; the interior settlements are mostly later immigrant, as considered under their respective names.

Johnville,—Cn. Important native settlement, formed in 1862 under the Labour Act, under the influence of Bishop John Sweeny, of St. John, and settled by Roman Catholics from St. John and Charlotte counties and other parts of the province, with a few from Nova Scotia and Ontario. *Chapmanville* is an extension of it. (Loc. inf.; Biographical Review of New Brunswick, 230).

Jolicoeur,—W. On the site of the Acadian villages *La Coupe* and *Le Lac*; permanently settled about 1770 as part of *Cumberland* township by New Englanders and Yorkshire men. (Loc. inf.).

Jones' Forks,—Y. Native N.B. and N.S. Land company settlement, formed apparently by expansion from older neighbouring settlements. (Loc. inf.).

Jordan Mountain,—K. Irish immigrant farming settlement. (Newspaper item).

Kars,—K. Parish est. 1859; settled along the St. John and Belleisle by Loyalists in 1784-85, and in the interior by expansion of their descendants. (Loc. inf.; C. L. R.).

Keirstead Mountain,—K. Loyalist expansion settlement, formed about 1820 to 1830 by settlers from the Belleisle. (Loc. inf.).

Kemble Manor,—K and Q. Township in Greenwich and Hampstead, granted in 1765 to a company who sold their rights to Stephen Kemble. He planned to settle it, but with little success, until the arrival of the Loyalists, to whom the St. John river front was sold, originating the present settlement. Settled in the interior by expansion from the river and by some immigrants later. (History by Howe in *New Brunswick Magazine*, I, 146; Hist. Sites, 333).

Kent,—Cn. Parish est. 1821. Settled first along the St. John, after 1810, by a few native settlers from the lower river, and in 1817 and later by disbanded soldiers of New Brunswick and British regiments; settled in the interior mostly by native expansion from St. John and other parts of the province, as noted under the respective settlements.

- Kent**,—A. Formed about 1859, apparently by expansion from the Irish settlements of Shepody road. (Loc. inf.)
- Kentville**,—Y. Small settlement, formed about 1850, by Robert Kent and other settlers from Nova Scotia. (Loc. inf.)
- Kilmaquac**,—Y. Former small Indian (Passamaquoddy) village, doubtless pre-historic, beside a fishing-fall and eel-pool on the site of St. Croix village. Its name appears on maps as late as 1897 (in Stanford's Compendium, Canada). (Hist. Sites, 222).
- Kilmarnock**,—Cn. Immigrant settlement, first formed about 1834 by two Irish settlers, and in 1843 by a Scotch settler, joined later by others. (Loc. inf.).
- Kincardine**,—V. Name used in 1872 to cover the two successful settlements now called Kintore and Stonehaven, and recently applied to a post office in an extension of the latter.
- Kingsclear**,—Y. Parish est. 1786; settled along the St. John by some Acadians at *French Village*, and Indians at *Indian Village*, but mostly by Loyalists of the disbanded regiment, the New Jersey Volunteers, 2nd Battalion. The interior settlements are native expansion and later immigrant, as noted under their respective names. (History of this regiment, by Raymond, in Coll. N.B. Hist. Soc., II, 207; location in Hist. Sites, 341, and Map 46).
- Kingston**,—Kt. See *Rexton*.
- Kingston**,—K. Loyalist township, est. 1783 and made a parish in 1786. Settled along its water front by Loyalists in 1783 and later, and in the interior by expansion of their descendants.
Kingston village was settled in 1783 by Loyalists chiefly from Connecticut (its history is given by Raymond in his "Kingston and the Loyalist of 1783," St. John, 1889). It was the shire town until 1871.
- Kinsale**,—G. Irish immigrant farming settlement, formed about 1841. (C. L. R.; Johnston, N. A. II, 10, and Report, 85).
- Kintore**,—V. Important recent Scotch immigrant settlement, formed in 1872 under the Free Grants Act and settled in 1873 by a colony from Kintore, in Kincardineshire, at the same time with Stonehaven. Some 712 immigrants came to these two settlements in 1873 and others later. (History is given fully in Stevenson's Reports, 1872-73; History of St. Andrew's Society, St. John, 1903, 105; Adams, 28).
- Kirkland**,—Cn. Apparently a combination of native settlers, expanding from *Maxwell*, with others of Scotch descent. (Loc. inf.).
- Knowlesville**,—Cn. Important native settlement, formed in 1860 under the Labour Act by settlers from Yarmouth, Nova Scotia, located here under the auspices of Rev. Charles Knowles, of Yarmouth, Free Baptist minister. (Loc. inf.; Select Committee Report, 90).
- Kouchibouguac**,—Kt. Settled originally soon after 1800 by English-speaking settlers, in part Scotch immigrant and in part expansion from older parts of the province, joined later by a few French. (Cooney, 148; loc. inf.; C. L. R.).

- Kouchibouguacsis**,—Kt. Also le Petit Kagibougouette; now St. Louis de Kent. Acadian settlement, formed before 1800 (grants in 1805), which has grown steadily to the present, expanding up this river, and to various parts of the Acadian parish of *St. Louis* and other parts of Kent. (Cooney, 149; Plessis, 180; C. L. R.).
- La Coupe**,—W. Former small Acadian village, probably on the western end of Jolicoeur Ridge, founded probably in the early 18th century as an extension of Beauséjour, and destroyed by the British in 1755. (Hist. Sites, 281).
- Lake George Settlement**,—Y. Native expansion and Scotch and Irish immigrant, formed about 1820. (Loc. inf.; Sketches of N.B., 43.)
- Lake Settlement**,—Kt. Acadian, an expansion from older settlements in the vicinity. (Loc. inf.).
- L'Amec**,—G. Also Lamec and Lameque. Important Acadian farming and fishing settlement, formed apparently about 1800, by Acadians mostly from *Caraquet*, with others from Quebec and Prince Edward Island. Location also of the Jersey fishing establishment, the Fruing Co., which has brought sundry Jersey settlers to this region. (Loc. inf.).
- Lancaster**,—J. Parish est. 1786; includes some settlers of the English period located in the earlier township *Conway*, but mostly settled along the water front by Loyalist families in 1783 and later, and by their expansion in the interior, with a single immigrant settlement at *Irishtown*.
- La Tour, Fort**,—J. Former important strongly-fortified French trading post, at the mouth of the St. John, founded before 1635 (probably in 1632), by Sieur de La Tour; taken and destroyed by his rival, Charnisay, in 1645. (Hist. Sites, 308, 276).
- La Treille**,—C. Early small French settlement on *Indian Island*, formed about 1686, and abandoned after its destruction by Church in 1704. (Hist. Sites, 266).
- La Valliere**,—W. Early French seigniorial settlement, near *Beauséjour*, probably on Tonges Island; founded about 1676 by Sieur de la Vallière, and abandoned at the expulsion in 1755. (Hist. Sites, 278).
- Lawfield**,—Q. Irish immigrant settlement, formed about 1840 by Michael Law and others. (Loc. inf.).
- Ledge**,—C. See *Dufferin*.
- Le Lac**,—W. Former Acadian village of considerable importance, founded probably in the early 18th century as an extension from *Beauséjour* on *Jolicoeur Ridge*, at the head of the Aulac, near the present Wrys Corner; destroyed by the British in 1755. (Hist. Sites, 280).
- Lepreau**,—C. Parish est. 1859; settled first at *Lepreau Village* by Loyalists in 1784, and later at *Macc's Bay* by expansion from Pennfield; by expansion of these, with a few settlers from other sources, the present settlements have been formed.
- Lepreau village was granted to Loyalists in 1784, and probably settled by them; later a prosperous mill-village grew up at the fine falls at the mouth of the river, which was largely abandoned on the destruction of the lumber on the river by fire before 1870. (C. L. R.; loc. inf.).

- Lerwick**,—V. Post office in a part of *Tilley*, said to be settled by some Shetlanders who came out to work on the N.B. and Canada railway. (Loc. inf.).
- Letang**,—C. Originally settled by Loyalists especially at the town of *St. Georges*, which was later abandoned. Later settled by a few Scotch immigrants from Argyleshire, about 1822. (Atkinson, *Emigrants' Guide*, 50).
- Letite**,—C. Granted originally to Loyalists in 1784, but apparently settled later, especially at Back Bay, by various native fishermen from different sources. (Vroom, *Courier*, LXXV).
- Lewis Mountain**,—W. Also North River Mountain. Native settlement, formed prior to 1827, probably by expansion from Moncton. (Cockburn Report, 18, 93).
- Lime Kiln**,—Y. See *English Settlement*,—Y.
- Lincoln**,—S. Parish est. 1786; includes the earlier estates *Morrisania* and *Gooldsborough*, partially settled by New Englanders. Chiefly settled, however, along the St. John, Oromocto and Rusagonis by Loyalists in 1783 and later, and in the interior by their descendants later.
- Little River**,—A. Native settlement, formed in 1817, by Robert Mitton, from *Sackville*, joined later by other settlers from the Petitcodiac. (Ms. History of Elgin, by W. A. Colpitts).
- Little Rosher**,—A. Settled about 1805 by natives of Nova Scotia. (Loc. inf.).
- Little Settlement**,—Y. An expansion from *Harvey*. (C. L. R.).
- Liverpool**,—Kt. Name for the town of *Richibucto* from 1826 until 1832.
- Loch Lomond**,—J. Settled apparently by Loyalist expansion soon after 1800. In 1836 there was an Irish Protestant settlement in this vicinity. (S. P. G. Report for 1836).
- Lockstead**,—N. Small native settlement, formed about 1878 under the Free Grants Act, and settled by native settlers from various sources. (Adams, 21).
- Loggieville**,—N. See *Black Brook*.
- Londonderry**,—K. Irish immigrant farming settlements established along the Shepody road prior to 1830. (Atkinson, *Emigrants' Guide*, 20; C. L. R.).
- London Settlement**,—Q. Combined native expansion and Irish immigrant, formed apparently after 1820. (Loc. inf.; C. L. R.).
- Long's Creek**,—Q. Loyalist expansion settlement, formed about 1810, from the Washdemoak. (Loc. inf.).
- Long Settlement**,—K. Irish immigrant, formed about 1847. (Loc. inf.).
- Long Settlement**,—M. Recent Acadian settlement, an expansion from the Madawaska settlements. (Loc. inf.).
- Lorne**,—R. Native expansion settlement, formed 1879 under the Free Grants Act, and settled by expansion from the older Scotch and Acadian settlements. (Adams, 14).



Louisbourg,—Kt. Acadian settlement, formed about 1850 by expansion from older places.

Louison River,—R. Settled first according to tradition, prior to 1800, by Louis Lavolette, an Acadian, whose descendants still live here. (Loc. inf.).

Ludlow,—N. Parish est. 1814. Settled along the Miramichi about 1801 by expansion from native settlements of the St. John and lower Miramien', with a later American village, *Boiestown*, and native expansion settlements on the uplands.

Lumsden,—A. Laid out under the Labour Act about 1850, and occupied by native settlers, mostly from Nova Scotia. (Loc. inf.).

Lutz Mountain,—W. Also Lutes Mountain; earlier called Moncton Mountain, Mountain Settlement, and perhaps Monmouth. Early native settlement formed before 1811 by expansion from Moncton, including descendants of the Pennsylvania Germans who had settled there in 1765. (Cockburn, 93; Alexander, *L'Acadie*, II, 109).

Lynnfield,—C. Native settlement, formed about 1831, by expansion from St. Stephen. (Loc. inf.).

Macdougall,—W. Early Scotch immigrant settlement, formed about 1818, by John Macdougall, from Argyleshire, Scotland, joined by a number of Scotch families from Prince Edward Island; has extended west to *Scotch Settlement*; now a railway station. (Loc. inf.).

Maces Bay,—C. First settled soon after 1784 by 5 families from the *Pennfield* settlers at Beaver Harbour,—apparently joined later by native settlers from various sources. (Loc. inf.).

Madawaska,—M. Indian (Maliseet) village, doubtless pre-historic; in 1787 it had 60 families and was the principal village and council-place of the St. John River Indians. Now of little importance and included in the *St. Basil reserve*. (Hist. Sites, 224).

The comprehensive name for the Acadian and Canadian settlements formed along the river St. John below the Madawaska, on the line of communication between New Brunswick and Quebec, in 1783 and following years, formed by settlers in part from Quebec and in part from the lower St. John and Kennebecasis. These settlements have prospered and expanded greatly, now forming most of the population and all the principal settlements of Madawaska county. The parish was established 1833, and a part of these settlements were transferred to the United States by the Ashburton Treaty in 1842. (History by J. G. D Dean, in Congressional Documents, 22 Congress, First Session, Document 3, page 17; Raymond, in Canadian History Readings, 279, 334; Collins, in the New England Catholic Historical Society Publications, No. 3, 1902; Mercure, in *Le Journal du Madawaska*, October and November, 1902; M. Mercure, himself an Acadian, has in preparation an exhaustive history of the settlements).

Magaguadavic,—C. Former name for the village of *St. George*.

Magaguadavic Ridge,—Y. Earlier Caledonia. Irish immigrant settlement, formed about 1831. (Loc. inf.).

- Magundy**,—Y. Irish immigrant settlement, formed before 1822, by Protestant Irish. (Loc. inf.; C. R.).
- Manners Sutton**,—Y. Parish est. 1855. Settled first about 1818 by Americans at Brockway, and later by English, Scotch and Irish immigrants near *Harvey* and *Cork*, and their expansion later to Oromocto Lake and the upper Magaguadavic waters.
- Maple Grove Settlement**,—Y. N.B. and N.S. Land Company settlement, formed by immigrants from Great Britain and native settlers from the Nashwaak. (Loc. inf.).
- Maple Ridge**,—Y. Native, formed about 1870 by expansion from St. John under the N.B. and N.S. Land Company. (Loc. inf.).
- Mapleton**,—A. Native farming settlement formed in 1845 by expansion from Elgin Corner. (Loc. inf.).
- Maquapit**,—Q. Important pre-historic Indian (Maliseet) village on the thoroughfare between Maquapit and Grand Lakes, in a situation admirable for the fishery. The site is notable for the great abundance and variety of pre-historic implements it has yielded. (An account of the site is given by L. W. Bailey in the *Bull. N.B. Nat. Hist. Soc.* VI, 1887, 3; also same *Bull.*, XIII, 1896, 84; *Hist. Sites*, 228).
- Markhamville**,—K. Recent mining (manganese) village in the midst of a native expansion district.
- Marr Settlement**,—Q. Recent Irish immigrant settlement. (Loc. inf.).
- Martignon**,—J. Former fortified French trading post on the west side of St. John Harbour, founded in 1672 by *Sieur de Martignon*, but abandoned before 1698. The name has been recently revived (Martinon) as the name of a railway station. (*Hist. Sites*, 277, 309).
- Martin's Head**,—J. Grants made here in 1785, but settlement was probably later.
- Martin's Point**.—R. See *Campbellton*.
- Martin Settlement**,—M. Est. 1896 under the Free Grants Act.
- Maryland**,—Y. Early native settlement, formed about 1817 by expansion of the descendants of the Maryland Loyalists from *St. Mary's* parish, joined by some Scotch immigrants. (Loc. inf.; C. R.).
- Marysville**,—Y. Modern mill and manufacturing town located at the falls of the Nashwaak. Apparently there was a mill here in the English period and probably through the Loyalist period; in 1866 the small village, Blake's Mills, was purchased with large areas of timber lands on the Nashwaak, by Alexander Gibson, under whose masterly management the mills have greatly prospered, a large cotton mill has been built, and the Canada Eastern railway constructed through it; town incorporated 1887. (History of Mr. Gibson's original purchase, by Edward Jack, in the *St. John Sun*, March 20, 1895; also Ward, 52).
- Mascareen**,—C. Scotch immigrant settlement, formed in 1822 by Highlanders from Perth, Sutherland and Caithness. (Atkinson, Emigrant, 48).

- Maugerville**,—S. Important early farming settlement, founded in 1763 on the site of the French *Freneuse*, by an association of some 50 families from Essex County, Massachusetts, who received a grant of Maugerville township in 1765; next to *Portland* it is the oldest English settlement in the St. John valley. With rich intervale lands and good communication, it has grown steadily to the present, sending many settlers to various parts of the province, notably to St. John and Fredericton and to the uplands of Carleton County. (History by Perley, in *Educational Review*, IV, 154; Hatheway, *History of New Brunswick*, Fredericton, 1864; Hannay, *Coll. N.B. Hist. Soc.*, I, 63, 119; Coulston, *St. John Sun*, September 1, 1898 and later numbers; Raymond, *St. John River*).
- Maxwell**,—Y and Cn. Native settlement, formed in 1842 by an association of mechanics from St. John under the auspices of Dr. Gesner. Apparently includes the present Monument Settlement, Dinnens Mills and Kirkland? (C. L. R.; Gesner, 171).
- Maxwell**,—Y and S. Temporary name for *Carlow*.
- McAdam**,—Y. Parish est. 1894 to include *McAdam Junction*, almost its only settlement.
- McAdam Junction**,—Y. Temporarily City Camp. Modern railway village, est. in 1869 in a barren environment by the intersection of two main lines of the C. P. railway, and prospering greatly through the establishment here of railway machine shops, etc. (Loc. inf.).
- McFarlane Settlement**,—Q. Irish immigrant settlement, formed about 1825. (Loc. inf.; Ward, 23).
- McKenzie Corner**,—Cn. Formed about 1822, by Capt. Wm. McKenzie, a Scotch immigrant, joined later by various native settlers.
- Mechanics Settlement**,—K. Native settlement, formed in 1842 by an association of mechanics from St. John, who were led to this step by the prevailing depression in business. It included some 237 members of the St. John Association, with others from Sussex, and some 24 squatters found on the tract when it was surveyed. On the revival of business many returned to the city, but apparently the majority remained and formed the settlement. (Its full history is given in letters, now in my possession, to the Lieutenant-Governor from M. H. Perley and A. Gesner, under whose auspices it was formed; Gesner, N.B., 144).
- Medisco**,—G. One of the tracts laid out for settlement in 1856 (surveyed 1853), but settled much later under other names by expansion of native and Acadian settlers. (C. L. R.).
- Meductic**,—Cn. Former important Indian (Maliseet) fortified village, doubtless long pre-historic, on an intervale at Lower Woodstock, located near good fishing grounds in a charming situation at the junction of the great Penobscot portage with the St. John; the principal Indian village of the St. John in the later 17th and earlier 18th centuries. It was occupied by the Indians, though simply by sufferance of the grantees, down to 1851, in which year the Woodstock reserve was pur-

chased for them, and they removed to it. (Its history is given fully in Raymond's monographic "Old Meductic Fort," in Coll. N.B. Hist. Soc., I, 221; Hist. Sites, 225; Perley, Ind., XCIII. The invaluable narrative by Gyles is announced, in an exhaustive edition by Victor H. Paltsits, to be published by Dodd, Mead & Co., New York).

Meductic,—Y. Name applied formerly to the locality now occupied by the town of *Woodstock* and applied in recent years to the village at the mouth of Eel river.

Memel,—A. Settled about 1830 by expansion from *Shepody*. (Loc. inf.).

Memramcook,—W. Also *Memeramcouke*. Early important Acadian village, formed probably near the present St. Joseph's College early in the 18th century by expansion from *Beauséjour*, and destroyed by the English in 1755. In 1760 some Acadians were in the vicinity, and in 1767 they were permitted to settle and ultimately were given grants of their lands there. With rich marshes the settlement grew and expanded, occupying lands which in 1805 came into possession of J. F. W. Des Barres; the Acadians became his tenants, but later, after extensive legal troubles, in 1842 bought their lands and have since prospered. The settlement is one of the two or three Acadian settlements in the province occupied by them before the Expulsion. (Hist. Sites, 281; Gaudet, *Le Moniteur Acadien*, September 21, 1886 *et seq.*, also August 30, October 7, 1887; December 3, 1897; Plessis, 257; Poirier, "Le Père Lefèvre et L'Acadie," Montreal, 1898; Rameau, *Colonie Féodale*).

Menagoueche,—J. Name used by the French in 1680 and later for the settlements at the mouth of the St. John, and for the fort on the site of Old Fort, Carleton, occupied by them about 1750-53. (Hist. Sites, 271).

Meringuin,—W. Settled chiefly by native expansion from Westcook and Dorchester Cape from about 1820 to 1850. (Loc. inf.).

Michaud,—M. Acadian, est. 1879-80 under the Free Grants Act. (Loc. inf.; C. L. R.).

Midjic,—W. Traditional Indian (Micmac) village, probably pre-historic, in a rich game region, and very likely the council-place of this region. (Hist. Sites, 230).

The present farming village was first settled prior to 1812 by expansion from Sackville. (Loc. inf.).

Midland,—K. Loyalist expansion farming settlement, formed about 1800, on the old Fredericton-St. John road.

Midland,—A. Native farming settlement, formed about 1830 by expansion from the Petitcodiac settlements. (Loc. inf.).

Military Settlements,—Cn. and V. Settlements formed in 1817 and later, (1) along the St. John river from Presquile to the Aroostook, (2) on the *Nashuaak Portage*, and (3) on the Fredericton-St. Andrews road east of *Piskahegan*, by disbanded soldiers of the New Brunswick Fencibles, 104th Regiment, 98th and 8th Regiments. They largely abandoned the two latter localities, but founded the present settlement of the former. (C. L. R. Sketches of N.B., 41; Raymond, Carleton County, 83-85).

Milkish,—K. Loyalist settlement, formed 1784. (Loc. inf.).

Millstream,—K. Loyalist expansion settlement, formed soon after 1783 by Loyalist families, joined in 1800 and later by some immigrants from Yorkshire and Ireland. It has expanded steadily up this stream to Berwick, Mount Middleton and head of Millstream. The settlements at its mouth were originally included in *Studville*. (History given fully in *St. John Sun*, April 7, 1892; Winslow Papers, 494).

Milltown,—C. First settled in 1785 by a part of the disbanded Scotch regiment, the 74th Highlanders, joined by Loyalists and settlers from various sources. Favoured by several valuable water powers it has grown to a prosperous mill and manufacturing (cotton) town; incorporated 1873. (Vroom, *Courier*, CIII).

Millville,—Y. A native N.B. and N.S. Land Company mill village, formed about 1860 by expansion from older parts of New Brunswick. (Loc. inf.).

Millville,—G. Acadian settlement, formed about 1874 under the Free Grants Act, and settled from the neighbouring Acadian districts. (Adams, 16).

Miramichi,—M. Old name for the settlements on the lower course of this river. Settled first by the French at Beaubears Island (*Boishébert*) and elsewhere, but its permanent settlement began in 1764 when William Davidson settled at Wilson's Point, and was soon after joined by other Scotch settlers from Scotland, Prince Edward Island, and Nova Scotia. It suffered severely from the attacks of American privateers during the Revolution, which led many settlers to remove to the St. John. After the Revolution some Loyalists settled here, and additional Scotch from the sources above mentioned continued to arrive, with considerable accessions of Irish after 1820, thus originating the present prosperous settlement of that river. (Hist. Sites, 330, 336; Cooney, 41; Raymond, Coll. N.B. Hist. Soc., II, 93; Winslow Papers, 500).

Miscou,—G. Originally this name applied to both this island and Shippegan. Early temporary French trading and fishing post, founded on an unknown site in 1623, by Raymond de la Ralde, and another founded 1652 by Nicholas Denys on the south shore of Miscou Harbour (Hist. Sites, 298); also an early Jesuit Mission, of St. Charles de Miscou, site unknown; also a temporary settlement (traditional) of Acadians from Prince Edward Island at Landry river, prior to 1773, who, in part, at least, removed to Nepisiguit. In 1775 also it had, perhaps, two English-speaking settlers (Hist. Sites, 331). Prior to 1819 a disbanded Highland soldier, named Campbell, with his family settled here (McGregor, II, 276), apparently later removing to Little Shippegan. Later, about 1825, Louis Gauthier and others from France settled at *Grande Plaine*, while about 1830 Andrew Wilson, an emigrant from Scotland by way of Miramichi, settled with his family at Wilson's Point, and a few other English-speaking settlers also came to Miscou Harbour about the same time. Acadians from neighbouring settlements gradually settled on the Island, apparently after 1820, and, prior to 1879, a Free Grant settlement was laid out there and taken up by them. (Loc. inf.; Adams, 16. A full and valuable account of this island in 1850 was given by

M. H. Perley, in his *Fisheries*, 32, 232; the earlier history of the island is fully treated by Dionne, "Miscou, Hommes de Mer et Hommes de Dieu," in *Le Canada Français*, II, 433, 514; Gaudet, *Le Moniteur Acadien*, Autumn of 1882).

Mitchell Settlement,—R. Native settlement, formed before 1879 under the Free Grants Act, and settled by expansion from the neighbouring older districts. (Adams, 14).

Moannes,—C. Loyalist settlement, formed in 1784 by a part of the Penobscot association of Loyalists. (Vroom, *Courier*, CVII).

Monckton,—Y. Former name for the village now called *Gibson*, apparently applied first to the trading post founded there by John Anderson in 1767, and used as late as 1822.

Monckton, Fort,—W. Name applied by the English to Fort *Gaspereau* when taken from the French in 1755.

Moncton,—W. Early township, including early Acadian settlements, granted in 1765 to a company which in that year brought some dozen families of Pennsylvania Germans as tenants and settled them on the present site of *Moncton City*, some of whom soon removed to *Hillsborough*. The proprietors failed to keep their agreements and the tenants in 1780 obtained possession of their lands by action of law against them, and the township was afterwards escheated. The settlement prospered from the first, and, joined by some settlers from *Sackville* and *Westmorland* and some Loyalists after the Revolution, together with some later immigrants from Great Britain, it has spread up the Petitcodiac and to the backlands, where also are some later immigrant settlements, as noted under their respective names. It was made a parish in 1786.

At the *Bend* of the Petitcodiac, there grew up early in the last century a prosperous village, which grew more rapidly after the building of the European and North American railroad in 1860, and the Intercolonial in 1874, so that it was incorporated as a town in 1875, and a city in 1890, the third in New Brunswick. (A very important document on its early history is in *Moncton Transcript*, December 21, 1901; also its history is sketched in a special number of the same journal, December 11, 1889, and in a special *Moncton* number of the *St. John Sun*, September 3, 1892; Botsford, in *Chignecto Post*, January 14, 1886; Hist. Sites, 335; *St. John Sun*, July 27, 1904).

Monteagle,—W. One of the tracts laid out for settlement in 1856, but not taken up.

Monument Settlement,—Y. An extension, apparently, of *Marwell*.

Moore's Mills,—C. Early mill village, formed about 1790 by William Moore, of *St. David's*. (Stevens, Charlotte County, 17).

Morrisania,—S. Large estate of the English period in Lincoln, granted in 1767 to Charles Morris and partially settled by New Englanders, who purchased from him; but mainly settled along the *St. John* by Loyalists after 1783. (Hist. Sites, 334; Raymond, in Coll. N.B. Hist. Soc., II, 158).

Morristown,—C. Early name for *St. Stephen*.

Mountain Settlement,—W. See *Lutz Mountain*.

Mount Pawlett,—Q. Large estate of the English period in Canning, granted in 1774, to William Pawlett, but apparently escheated and settled by Loyalists after 1783. (Hist. Sites, 334).

Mount Pleasant,—W. Native settlement, an expansion from older parts of *Botsford*, especially the Baie Verte Coast and the English settlement at *Murray's Corner*.

Mount Theobald,—J. Native farming settlement, formed about 1843 by an association of settlers from *St. John*, apparently later joined by some Irish immigrants, but afterwards largely abandoned. (Loc. inf.; Select Committee Report, 95, 101).

Mount Whatley,—W. First settled by New Englanders as part of *Cumberland* township after 1761, with a large accession of Yorkshiremen after 1772. (Loc. inf.; Trueman, Chignecto Isthmus).

Murray's Corner,—W. English immigrant settlement, between *Shemogue* and *Cape Jourimain*, formed in 1820 (or '21) by a number of English families. They have mingled with settlers from *Sackville* and *Cumberland* and *Westmorland*, and with some Scotch immigrants at *Shemogue*, *Cape Tormentine*, and in the interior. (Johnston, N. A., II, 66; 70; Trueman, 50).

Musquash,—J. Parish est. 1877. First settled at *Musquash* village by Loyalists in 1783 and by Loyalists also at *Dipper Harbour*. The expansion of their descendants has settled other places along the coast. *Musquash* village early grew up as a mill village around the falls here, was for a time called *Ivanhoe*, and was almost totally destroyed by fire in June, 1903. (History in *St. John Sun*, June 17, 1903; *Acadiensis*, III, 8).

Myshrall Settlement,—Y. Acadian settlement, formed, probably, about 1840, as an expansion from the Anglicized Acadian settlement (the *Mazerolle* family) *Lower French Village*. (Loc. inf.).

Nachouac,—Y. Early French fort (*Fort St. Joseph*) and small settlement on the north side of the mouth of the *Nashwaak*, built (for safety from the English who had taken *Port Royal* in 1690) in 1692 by *Villebon* as a temporary capital of *Acadia* and occupied until 1698, when it was abandoned and destroyed. (Hist. Sites, 273; Raymond, *St. John River*, 49).

Napan,—N. Scotch immigrant farming settlement, formed about 1822 by settlers from *Annandale*, *Dumfries*. (Johnston, N. A., I, 110; Cooney, 117).

Nash's Creek,—R. Est. 1901 under the Free Grants Act.

Nashwaak,—Y. First settled by the French as *Nachouac*, and later in the English Period at *Monckton*. Its modern settlement originated with the Loyalists of *St. Mary's*, and the later immigrants of *Stanley*.

Nashwaak Portage,—Y. Settled first by disbanded soldiers about 1818 as one of the *Military Settlements*; later abandoned.

Neguac,—N. Also Nigaouec. Acadian farming and fishing settlement, dating possibly from 1761, in which year there was a village here. (Smethurst, 16, he calls it Merrimichi). Traditionally it is said that the first settlement was temporary, and its modern settlement began about 1781, with Otho Robichaud as first settler. Later, a few English-speaking settlers from Miramichi and elsewhere settled here. (Gaudet, *Le Moniteur Acadien*, February 22, 1889; March 1, 1889; loc. inf.; Plessis, 169).

Nelson,—N. Parish est. 1814; settled apparently along the Miramichi, prior to 1800, by early Scotch immigrants and by Loyalist expansion from the St. John.

The village of Nelson is said to have been settled, after 1829, by Irish settlers from *Barnaby River* and *Nowlan*, who bought lots there to be near the Roman Catholic Church. (Loc. inf.; Cooney, 110).

Nepisiguit,—G. Early name for the settlements around Bathurst Harbour, also called *St. Peter's*. Temporary French (Recollet) Mission, founded in 1620, site unknown; in 1644 the Jesuit Mission was established, probably at Ferguson's Point. Later, probably about 1669, a fortified trading post was established at Ferguson's Point by Nicholas Denys, but soon abandoned. Later, about 1670, one Enault had a settlement here, site uncertain. Its history thence to 1761 is a blank, but in that year many Acadians were settled here, probably the ancestors of the present Acadian settlers, as considered under *Bathurst*. (Hist. Sites, 299, 300; Smethurst, Narrative; Gaudet, *Le Courier des Provinces Maritimes*, May 31, and November 22, 1894; Winslow Papers, 501).

Nerepisse,—K. Small unimportant early fortified Indian village, in the angle between the Nerepis and St. John. It was occupied and strengthened in 1753 by the French under Boishébert (*Fort Boishébert*), but soon after abandoned and destroyed. There was, perhaps, also a small Acadian settlement here before this time. (Hist. Sites, 271, 276).

Nerepis,—K. Settled first by Indians and French as *Nérépisse*. Its permanent settlement begins in the English period with *Glaciers Manor*, but it was principally settled near its mouth by Colonel Coffin (at *Alwington*) and other Loyalists. By expansion of their descendants up the river, and, with some immigrants in addition, it has been settled up the Douglas Valley and up the North Branch.

New Bandon,—G. Important early Irish immigrant settlement, formed in 1819 by 70 Protestant families from Bandon, in Ireland. It has prospered and expanded to Innishannon and other back settlements. The parish was established 1831. (Cooney, 186; McGregor, II, 279; Johnston, N. A., II, 16; S. P. G. Report, 1826, 93, which says, "Begun eight years ago by Francis Ellis, whose representations to others in Ireland led them to emigrate").

Newburg,—Cn. Irish immigrant settlement, formed about 1820, by families chiefly from Derry. (Loc. inf.; Ward, 67).

Newburg Junction,—Cn. Established in 1873 when the Woodstock Branch was built to connect with the Fredericton-Edmundston (New Brunswick and Canada) Road. Originally it was several miles further east, and was later removed to its present position.

New Canaan,—Q. Loyalist expansion settlement, formed in 1792 by George Price and 15 Loyalist families from the St. John, all Baptists, attracted here by the superior intervale lands. The settlement has grown and prospered down to the present day, sending off branches to Butternut Ridge and elsewhere in the vicinity. (History fully related in *St. John Sun*, July 27, 1892; there is also a history of the Church here, by Rev. George Brown, privately printed, 1903; Alexander, *L'Acadie*, II, 146; the Council Records, Land Memorials, preserved at Fredericton, under August 2, 1799, read: "Seth Bryant and George Webb Price represent that they with others, being 16 heads of families and 2 single men, commenced a settlement in the year 1792 thirty-two miles above the Narrows on the Washdemoak river, that they have made large improvements," etc.).

New Cannaway,—Q. (or S.). Temporary name, 1823, for one of the settlements north of Grand Lake. (C. R.).

Newcastle,—Q. Settled at its mouth by Loyalists in 1784, and gradually up the stream by their expansion. Some coal mining, in limited amount, is done here. On the upper part and vicinity are some immigrants, chiefly Irish.

Newcastle,—N. Parish est. 1786. Settled originally along the Miramichi, prior to 1785, by early Scotch immigrants, joined after the Revolution by some Loyalists, and, later, with the development of the timber trade, by many Scotch and some Irish immigrants.

The town of Newcastle, shire town of Northumberland, has grown up mainly since the great fire of 1825, chiefly as a (steam) mill and lumber shipping port; incorporated. (Cooney, 108; loc. inf. No history of this important town has yet been published).

New Denmark,—V. For a time called Hellerup. Recent Danish immigrant settlement, formed under the Free Grants Act in 1873, by Danish families brought out by the New Brunswick Government. It has proven a very prosperous colony. (A full history of the formation of the settlement is in Stevenson's *Emigration Reports* for 1873, 1874; loc. inf.; Adams, 26).

Newfoundland,—M. Also called Grand Ruisseau, Acadian settlement, formed about 1860 by expansion from the St. John. (Loc. inf.).

New Horton,—A. Native expansion settlement, formed about 1798 by expansion of native settlers from Horton, Nova Scotia. (Loc. inf.; Johnston, N. A., II, 102; Ward, 12).

New Ireland,—A. Early Irish immigrant settlement, formed on the Shepody road, before 1830 (grants in that year). (Loc. inf.; Johnston, N. A., II, 109; Lugin, 109; *St. John Sun*, September 7, 1888).

Also this name was applied in 1826 to some settlement twenty miles from Gagetown. (S. P. G. Report, 1826).

New Jersey,—N. Local name for *Burnt Church* village.

New Jerusalem,—Q. Early Irish immigrant settlement, formed about 1821, apparently on a part of *Kemble Manor*. (Ward, 22; *St. John Sun*, July 27, 1892, under "Queens County").

- Newmarket Settlement**,—Y. Irish immigrant settlement, formed about 1839 by settlers from the north of Ireland. *Smithfield* is an extension of this. (Loc. inf.).
- New Maryland**,—Y. Parish est. 1846. Settled first, about 1817, by Loyalist descendants and (1818) by early Scotch immigrants at *Maryland*, and somewhat later by native expansion at *Beaver Dam* and *Yoho*.
- New Mills**,—R. Founded as a mill village before 1814, but settled in the vicinity later, probably after 1830, by Scotch from the Island of Arran. (Cooney, 204).
- New Scotland**,—W. Scotch immigrant settlement, formed about 1866. (Loc. inf.).
- Newton**,—Y. Former township in York at mouth of the Nashwaak, granted to a company in 1765, but afterwards escheated. It had some eight families, mostly driven from Nova Scotia by privateers, in 1783. (Hist. Sites, 326, 334; Coll. N.B. Hist. Soc., I, 109).
- Newtown**,—K. Native farming centre, settled before 1812, by Loyalist expansion from the lower part of Smith's Creek. (St. John *Sun*, April 7, 1892; loc. inf.).
- New Warrington**,—C. Early English immigrant colony of some forty tenant settlers brought from Liverpool to Campobello in 1770 by Captain William Owen, grantee (in 1767) of the Island, and settled at Curry's Cove. Many of the settlers left for England, but some remained and, joined by various New Englanders and later immigrants, they founded the present settlements of Campobello. (Its history is fully given in the "Journal of Captain William Owen," Coll. N.B. Hist. Soc., I, 193; II, 8; Hist. Sites, 325, 332).
- New Yorkshire**,—Q. Settlement in 1826, twenty miles from Gagetown, identity unknown. (S. P. G. Reports, 1826).
- New Zion**,—S. Native settlement, formed about 1860, by expansion from the neighbouring parts of the province. (Loc. inf.).
- Nid d'Aigle**,—K. Early French establishment, dating from before 1749, at or near Wordens, below Spoon Island, perhaps a battery erected to protect the Acadian settlements above it. On this site the English erected a battery, still to be seen, in 1812. (Hist. Sites, 275; N.B. Magazine, III, 228; Raymond, St. John River, 91).
- Northampton**,—Cn. Parish est. 1786. Originally settled along the St. John by a disbanded Loyalist regiment, the Pennsylvania Loyalists, and in the interior by later immigrant settlers, as noted under the settlement names. (History of the regiment, by Raymond, in Coll. N.B. Hist. Soc., II, 209; location in Hist. Sites, 343 and Map 46; also Raymond, Carleton County, 37, 78).
- North Branch Settlement**,—Q. Formed about 1820 by North of Ireland immigrants. (Loc. inf.).
- North Branch Settlement**,—Q. Irish immigrant settlement, formed after 1820 by families from the north of Ireland. (Loc. inf.).

- Northesk**,—N. Parish est. 1814. Settled first along the Miramichi by a very few Scotch settlers, prior to 1785; later, with some Loyalist expansion, English, Scotch and Irish immigrant settlements have gradually extended up the north-west to Portage river, reaching it about 1814, and Tomogonops before 1819; in the interior are some native expansion settlements, noted under their respective names.
- Northfield**,—S. Parish est. 1857. Settled mostly by immigrants, chiefly Irish, with some native settlers, an expansion from Grand Lake, as noted under the respective settlements.
- North Joggins**,—W. Free stone quarry village, formerly active, now abandoned, formed by native settlers, mostly from Westmorland. (Loc. inf.).
- North Lake**,—Y. Parish est. 1879. Settled apparently first in 1842 at *Marwell*, on Eel river, since which time a few other settlements have been gradually formed by native expansion, as noted under their respective names.
- North Richmond**,—Cn. Settled 1823 by Andrew Currie, from the St. John. (W. O. Raymond, Ms.).
- Norton**,—K. Parish est. 1795. Settled originally along the Kennebecasis by Loyalists in 1783 and later, and in the interior by later expansion of their descendants.
- Nortondale**,—Y. Native settlement, formed about 1860 by expansion from Carleton County. (Loc. inf.).
- Norton Station**,—R.R. station est. 1859, and a junction of the Central Railway. Near here was the "Fingerboard," where the old road to Fredericton left the Westmorland-St. John Road. (Alexander, *L'Acadie*, II, 105).
- Nowlan**,—N. Also Reynolds. Said locally to have been settled in 1827 and later by Irish settlers from the Miramichi; later expanded, with *Barnaby River*, to form the village of *Nelson*. (Loc. inf.).
- Oak Bay**,—C. Loyalist settlements extending all around the bay, formed in 1784 by the Penobscot Association of Loyalists, whose descendants still occupy their lands. (Vroom, *Courier*, CVI).
- Oak Hill**,—C. An expansion from *Scotch Ridge*.
- Oak Mountain**,—Cn. See *Spearville*.
- Oak Point**,—N. Former small Acadian settlement with 5 families, said to have come from Cambridge, Mass., about 1800,—but after 1812 they removed elsewhere. (Plessis, 174; loc. inf.).
- Oak Ridge**,—S. Small native farming settlement, formed before 1879 under the Free Grants Act, with but few settlers.
- Ohio Settlement**,—Kt. Acadian farming settlement, formed about 1840 by expansion from St. Anthony. (Loc. inf.; Johnston, N. A., II, 62).
- Old Fort**,—J. A well known locality on the west side of St. John Harbour, occupied by a series of forts from 1645 or earlier down to *Fort Frederick*. (Hist. Sites, 276, 277, 278).

Oldham Sett,—Y. Early native settlement, formed probably about 1830 by expansion from the St. John. (Loc. inf.).

Old Mission Point,—R. Site of the former Micmac village of *Restigouche*.

Old Ridge,—C. Settled in 1785 and later by the Port Mattoon Association of Loyalists as a part of *St. Stephen*.

Olmaston,—See *Almeston*.

Old Stanley Road,—Y. The first settlement formed outside of Stanley by the N.B. and N.S. Land Company; they brought out and settled here in 1837 some Isle of Skye Crofters, who, however, proved unadapted to the new conditions and abandoned the settlement, which is now growing up in forest. (Loc. inf.).

Oromocto,—S. Indian (Maliseet) reserve of 125 acres, purchased for the Indians September 12, 1895, and occupied by a small permanent village.

Oromocto,—S. First settled by Acadians at *French Lake* and the mouth of the river; but its permanent settlement began, with Loyalists, in 1784 and later, all along the river to the Forks; their descendants expanded up both branches prior to 1810, nearly to the extent of their present settlement.

Oromocto village settled, apparently, prior to 1783, by a few New Englanders, but principally by Loyalists after that date.

Otnabog,—Q. Negro settlement on the north side of Otnabog Lake. The tradition among them is that it was settled about 1812 by a number of families from Virginia, formerly slaves; and hence presumably they came with the Loyalists. The grants were made in 1830. (Loc. inf.; C. L. R.).

Ouescak,—W. See *Westcock*.

Ouigoudi,—J. Pre-historic fortified Indian village (Micmac or Maliseet) on Navy Island, in St. John Harbour. Situated in a rich game region and central situation it was probably an important council-place. The name was supposed by Champlain to belong to the St. John river, but Lescarbot applies it to the village, and it is known to apply to any camping ground. (Hist. Sites, 229).

Pabineau,—G. Indian (Micmac) reserve of 1000 acres, occupied by a few families. (Perley, Ind., CIV, CXIII).

Pacquetville,—G. Acadian settlement est. 1866 under the Labour Act, and settled by expansion from the neighbouring settlements. (C. L. R.; Adams, 15; Rameau, II, 279).

Palmerston,—Kt. Original name of *St. Louis* parish, changed 1866.

Parent Ridge,—Y. Settled in 1864 or later by "skedaddlers" from Maine, who came here to escape the draft into the Union armies.

Park's Hill,—Cn. Settled first in 1814 by Samuel Parks, from Amity, Maine, with some other American settlers. (Loc. inf. and mentioned in Documents connected with the Boundary Surveys).

Passamaquoddy,—C. Settled first at *St. Croix Island*, but temporarily, in 1604 by DeMonts' colony. It was next occupied by the seigniorial establishments or residences of *St. Aubin*, *Chartier* and *La Treille*, with other scattered French who were expelled by Church in 1704. It was next occupied, after 1763, by New England fishermen and traders at *Indian Island*, *Scoodic*, *Deer Island* and *Wilson's Beach*, by English immigrants at *New Warrington*, *Campobello*, in 1770, but it received its greatest accession of population through the coming of the Loyalists, who settled all the best parts of the bay, the larger islands and the *St. Croix river*, as noted under their respective settlements.

Patrieville,—M. Acadian settlement est. 1878 under the Free Grants Act, and settled by expansion from the neighbouring Madawaska settlements. It has also some Irish settlers from Silver Stream and Claire. (Adams, 31; loc. inf.).

Paterson Settlement,—S. Irish immigrant, formed before 1839. (Ward, 37; C. L. R.).

Peel,—Cn. Parish est. 1859. Settled first along the *St. John*, about 1800 to 1810, by native settlers from the lower *St. John*, descendants of Loyalists and New Englanders, with some disbanded soldiers after 1817 in the upper part; settled in the interior by expansion of these settlements.

Pélerin Settlement,—Kt. Acadian, formed about 1830 by expansion from neighbouring settlements. (Loc. inf.).

Peltoma,—Y. and S. One of the tracts laid out for settlement in 1856, but settled apparently after 1872 under the Free Grants Act, and occupied by native settlers from various sources. (Adams, 33).

Pennfield,—C. Parish est. 1786. First settled in 1783 by an association of Loyalists from Pennsylvania, for whom a town called *Bellevue* (containing some 200 houses in 1787 and devastated by fire in that year) was laid out at Beaver Harbour. Few of the settlers, however, remained here, some removing to Pennfield Ridge, others to Mace's Bay, and others elsewhere. Later, various immigrants and native settlers joined those at Pennfield Ridge thus settling that locality, while other Loyalists, and their expansion, settled the various harbours along the coast. (Vroom, *Courier*, LXXII and Coll. N.B. Hist. Soc., II, 73; a full history of the parish in later times is given by J. G. Lorimer, in the *St. Croix Courier*, July 27, 1893; Winslow Papers, 490).

Perth,—V. Parish est. 1833. Settled first, after 1800, along the *St. John* by scattered native settlers from the lower river, with a large accession when the disbanded regiments were settled here in 1817 and later, forming the *Military Settlements*. Settled along the *Tobique* by native expansion, as noted under the respective settlement names. An early post house, kept by one Larlee, was situated a mile or two below Perth village, and his descendants, the Larleys, are numerous in the vicinity. (Loc. inf.).

Petersville,—Q. Parish est. 1838. Settled first along the lower Nerepis by expansion of the Loyalist settlements of the St. John, prior to 1812, and up the North Branch, between 1812 and 1830, by native settlers with some Irish immigrants; the backlands are settled by some later Irish immigrants, as noted under the respective settlements.

Petersville Church was settled after 1820, chiefly by Irish. (Loc. inf.).

Petitcodiac,—W. Several early Acadian villages of some importance, principally at the present *Fox Creek* with others at *Moncton*, *Hillsborough* and *Coverdale*, first formed about 1698 by settlers from Port Royal; they continued to thrive until the villages were destroyed by the British after the expulsion in 1755, and again in 1758. In 1760 some Acadians were in refuge here, and in 1767 they were permitted to settle at *Fox Creek* and *Belliveau*, on the sites of the earlier settlement. (Hist. Sites, 281; Rameau, *Colonie Féodale*, I, 249, II, 334).

The permanent settlement of this river began in 1765 with the Pennsylvania German settlement at *Moncton* and, soon after, *Hillsborough*. These were later joined by some disbanded soldiers from Fort Cumberland, and especially by an expansion of the settlers of *Sackville* and *Westmorland*. A combination of the descendants of these settlers, with a very few Loyalists and some later immigrants, have settled the entire basin of this river.

Petit Rochelle,—Quebec. Former large Acadian refugee town on the north side of the Restigouche river above Campbellton. It was founded, apparently, by Acadians emigrating from the Peninsula in 1750, enlarged by refugees from the expulsion in 1755, farther increased on the abandonment of *Boishévert* in 1757, and destroyed by Byrons fleet in 1760. It was protected by batteries on the commanding bluffs at Point La Garde and Battery Point below it. (Hist. Sites, 301; Cooney, 211, 287; Educational Review, X, 1897, 195).

Petit Rocher,—G. Acadian fishing and farming settlement, formed in 1797 by Pierre La Plante and other Acadians from *St. Peter's (Bathurst Village)*, who were attracted here by the superior facilities for fishing. It grew steadily and has expanded to the neighbouring backlands. (Its history is given by Gaudet in *Le Courier des Provinces Maritimes*, October 31, November 7, 1895; Cooney, 197; Plessis, 116).

Pinkerton,—C. Native settlement, formed after 1842 on a tract surveyed for the St. Andrew's Highland Society; now largely abandoned. (Loc. inf.; C. L. R.).

Pisarinco,—J. Originally assigned to Loyalists, but mostly settled later as a fishing village by settlers from various sources.

Pleasant Ridge,—C. Early native expansion settlement, formed on the Fred-erickton-St. Andrews road, in or soon after 1808, grants 1812, apparently by settlers from St. Andrews and the river St. John. (C. L. R.).

Pleasant Ridge,—N. Native settlement, formed about 1878 under the Free Grants Act, and settled by expansion from neighbouring parts. (Adams, 19).

Pleasant Ridge,—N. An extension of *Rogerville*. (Loc. inf.).

Pleasant Valley,—A. Native settlement, formed 1831 by expansion from older parts of the Petitcodiac. (Loc. inf.).

Plourde,—M. Acadian settlement, formed before 1879 under the Free Grants Act and settled by expansion from the St. John. (Loc. inf.).

Plymouth,—Cn. Settled first about 1820 by mixed Irish, English and native settlers. (Loc. inf.).

Pocowogamis Settlement,—Y. Native expansion, apparently formed about 1845 by expansion from the St. John river. (Loc. inf.).

Pointe de Bute,—W. See Pont à Buot.

Pokemouche,—G. Indian (Micmac) reserve of 2477 acres, established May, 1804, but not now occupied, though there was apparently an Indian village here in 1761. (Smethurst; Perley, Ind., C. CXIII, CXXVII).

Important Acadian settlement (Lower or Isle Pokemouche, or Poquemouche), founded by Isidore Robichaud, from Bonaventure, in 1797. It has grown steadily and expanded to other parts of the country. (Gaudet, newspaper articles; Winslow Papers, 501; Gesner, 199; Cooney, 177; loc. inf.).

Upper Pokemouche is an English and Irish immigrant farming, fishing and lumbering settlement, between Isle Pokemouche and the Indian reserve, formed between 1825 and 1830. (C. L. R.; Cooney, 177).

The settlements on the north side of the river are Acadian and of later date, some recent.

Pokeshaw,—G. Irish immigrant, an extension of *New Bandon*. (Loc. inf.).

Pokesoudie,—G. Settled by Acadians, about 1816 and later, apparently an expansion from Caraquet. (C. L. R.).

Pokiok Settlement,—Y. Irish (Protestant) immigrant, formed between 1820 and 1830. (Loc. inf.).

Pomeroy Ridge,—C. An expansion from *Scotch Ridge*.

Pont à Buot,—W. Early small Acadian settlement and fortified French post near a former bridge across the Miseguash; destroyed by the British in 1755. The permanent settlement of the vicinity was commenced by New Englanders in 1761 as part of *Cumberland* township, and in 1772 and later a number of Yorkshiremen purchased farms here, originating the present village of *Point de Bute*. (Hist. Sites, 285; a full account in Trueman's Chignecto Isthmus).

Poodiac,—K. Native settlement, formed in 1820 or soon after, apparently by expansion from older Loyalist settlements. (C. R.).

Portage,—W. Former small Acadian village, founded probably in the early 18th century as a post at the junction of the land and water part of the Miseguash-Baie Verte Portage, and destroyed by the British in 1755. The vicinity was settled about 1800 by expansion from Cumberland. (Hist. Sites, 287).

Porter Settlement,—C. Laid out 1852, on the road from St. Stephen to Little Falls, but never settled. (C. L. R.).

Piskahegan,—C. Apparently first settled in 1818, in connection with the "military location" laid out along the Oromocto-St. Andrews road for disbanded soldiers, chiefly of the 98th Regiment. For the most part these lands were not taken up, or soon abandoned, but a few settlers remained, originating this settlement. (Its history is fully given in "a plan of the military location between the Magagaudavic river and the Oromocto, consisting of 60 lots . . . on the road from St. Andrews to Fredericton, 1819," and in an elaborate "Report on the state of the lots of land located to the officers, non-commissioned officers and privates of the 104th, New Brunswick Fencibles, and 98th Regiment, between the Magagaudavic and Oromocto Rivers," by C. Campbell, 1825, both of which documents are in the Crown Land Office.

Port Elgin,—W. The vicinity was settled originally soon after 1763 by New Englanders from *Cumberland* and *Sackville*, but the present thriving village is later, formed since 1840, and has a number of settlers from various sources. (Loc. inf.).

Portland,—J. Important early trading village, formed at the mouth of the St. John in 1762, by Messrs. Simonds, White and Hazen, of Newburyport, Mass. It grew slowly until the advent of the Loyalists, since which, with many accessions from later immigrants, it has grown steadily to the present. It became a parish in 1786, a town in 1871, a city in 1883, and a part of St. John in 1889. (Its earlier history has been treated exhaustively by Raymond, in his "At Portland Point," in the *New Brunswick Magazine*, Vols. I, II, III; in *Coll. N.B. Hist. Soc.*, I, 160, 187, 306, II, 29; and in his *St. John River*).

Preé des Bourques,—W. Also Bourgs, etc. Former small Acadian village on the site of *Sackville*, formed probably in the early 18th century as an extension of *Beauséjour*, and destroyed by the British in 1755. (Hist. Sites, 281).

Preé des Richards,—W. Former small Acadian village on the site of upper *Sackville*, formed probably in the early 18th century by expansion from *Beauséjour*, and destroyed by the British in 1755. (Hist. Sites, 281).

Presquile,—Cn. Military post est. on the south side of the mouth of this river 1791, and abandoned about 1822. Settled in the vicinity about 1800 by native settlers from the lower St. John who, in later years, extended gradually up this river and to the neighbouring backlands. (Hist. Sites, 346; *Sketches of N. B.*, 42; Raymond, *Carleton County*, 75, 76).

Prince William,—Y. Parish est. 1786; settled in 1783 along the St. John by an important disbanded Loyalist regiment, the King's American Dragoons, and in the interior by various later immigrant settlements, noted under their respective names. (History of the Regiment, by Raymond, in *Coll. N.B. Hist. Soc.*, II, 211; location in Hist. Sites, 343 and Map No. 46; Winslow Papers, 485).

Prosser Brook,—A. Settlement, founded in 1829 by John Prosser, an Englishman, one of the disbanded soldiers of the West India Rangers. (Loc. inf.). Most of the men of this regiment settled at *Ranger Settlement*.

Protectionville,—N. See *Sugary*.

Quaco,—J. Old Indian name for *St. Martins*.

Quaco Road,—J. See *Emigrant Settlement*, J.

Queen Anne Settlement,—R. Apparently an expansion of *Balmoral*.

Queensbury,—Y. Settled originally along the St. John by disbanded Loyalist regiments, the Queen's Rangers, the New York Volunteers, the Royal Guides and Pioneers, and in the interior by later native expansion, Scotch immigrant, and N.B. and N.S. Land Company settlements, as noted under their respective names. (History of these regiments, by Raymond, in Coll. N.B. Hist. Soc., II, 202, 204, 211; their locations in Hist. Sites, 243, Map 46).

Quisibis,—M. Also André Settlement. Acadian settlement, formed about 1820 by expansion from the Madawaska settlement. (Loc. inf.).

Ranger Settlement,—V. Formed in 1819 by a disbanded British regiment, the West India Rangers. (Raymond, Carleton County, 83; N.B. Magazine, III, 28).

Red Bank,—Q. Small native expansion and Irish immigrant settlement, formed about 1837. Locally there is a tradition that there was a French fort at the mouth of the creek, and there was an Indian camp-site there. (Loc. inf.).

Red Bank,—N. Important Indian (Micmac) reserve, originally 10,000 acres (now 3397), est. August 13, 1783, and occupied by a small permanent village. A part of this reserve on the north side of the Little Southwest Miramichi (now 2353 acres), is not occupied by Indians. (Perley, Ind., XCVIII, CXI, CXXVII).

Red Rapids,—V. Native settlement est. 1875 under the Free Grants Act, and settled since 1878 by expansion from neighbouring native settlements. Includes Birch Ridge. (Adams, 30).

Red Rock,—Y. An N.B. and N.S. Land Company settlement, formed about 1843 by English immigrants from Northumberland.

Renous,—N. Small unoccupied Indian (Micmac) reserve of 100 acres, est. August, 1817.

Renous River,—N. Settled at its mouth before 1800, as noted under *Blackville*. The lower course of the river settled, about 1820-30, chiefly by Irish immigrants.

Restigouche,—R. Former important Indian (Micmac) village on Old Mission (or Old Church, or Ferguson's Point), above Campbellton, first mentioned in the Jesuit Relations in 1642; removed to the present Mission Point, Quebec, in 1759. The removal was doubtless to bring the Indians from Protestant Nova Scotia to Roman Catholic Quebec. Probably the Old Mission Point was on land granted by Richard Denys de Fronsac for an Indian mission in 1685. (Hist. Sites, 233).

Restigouche,—R. A name formerly applied to all the settlements collectively at the mouth of this river, and still to some extent so used. Settled first by the French at *Petit Rochelle*, and on the site of *Campbellton*, but its permanent settlement began about 1770, when Messrs. Shoolbred

and Smith established a salmon fishery here, and brought out eight Aberdeen fishermen to carry on this fishery. Some of these settled on the site of *Campbellton*, where also, at Walker's Brook, was a branch of Commodore Walker's trading station of *Alston Point*. After 1780 Henry Lee took up this fishery, brought out additional settlers from Aberdeen, who, joined by a few Loyalists, and by additional Scotch immigrants, after 1796, originated the prosperous settlement of that region. (History somewhat fully given by Herdman, in *St. John Sun*, in 1883; Hist. Sites, 331; Cooney, 224; Winslow Papers, 355, 501).

Reyton,—Kt. Until 1901 called *Kingston*. Founded about 1825 as a ship-building and lumbering centre by John Jardine, later continued by others, originating a prosperous village, a part of the English-speaking population of the Richibucto. (Loc. inf.)

Riceville,—M. Acadian settlement, est. 1872 under the Free Grants Act and settled by expansion from neighbouring settlements. (Loc. inf.).

Richard,—Kt. Est. 1890 under the Free Grants Act.

Richibucto,—Kt. Important Indian (Micmac) reserve, established September 9, 1805, with extensive bounds on both sides of the river, but reduced February 25, 1824, to the north side with 5720 (now 2221) acres. Has a large permanent settlement known as Big Cove. (Perley, Ind., CXIII, CXXVII).

Also an important fortified Micmac village, without doubt pre-historic, on Richibucto Harbour, exact position unknown, mentioned by Denys in his "Description Géographique" of 1672.

Also an early French settlement of 1682. (See *Chauffours*).

Also a temporary refugee Acadian settlement in 1760, on a site not known, but probably at the present town, where an early settlement occurred. (Cooney, 134).

The permanent settlement of this river was begun in 1787 by Solomon Powell, a Loyalist from the St. John, who settled at the upper part of the present town of Richibucto. He was accompanied or followed by his brothers and other Loyalists who settled above him on the river, as well as on the south side near its mouth, where Powell and Pagan established a prosperous trading and shipbuilding establishment, long the centre of trade on the river. In the meantime, in 1790, the Acadians founded *Richibucto Village* and *Aldouane*. Later, more native settlers came to the river, and, after 1818, many Scotch and Irish (especially north of Ireland) immigrants came here, and, with the descendants of the first settlers, extended up the Richibucto and its branches, thus giving an English-speaking population to almost all of the entire valley and the backlands, including nearly all of the present parish of *Weldford*. In 1822 and 1823 a large part of the Indian reserve, including all that part of the south part of the river, was thrown open for settlement and taken up by these settlers.

The town of Richibucto (for a time called *Liverpool*) was established as the shire town of Kent in 1826, laid out in 1829 and, under the stimulus of a great lumber trade, grew to a considerable town, reaching its culmination about 1850.

(Manuscript notes by H. A. Powell; Hist. Sites, 230; Cooney, 135, 149, 151; Perley, Fisheries, 55; Brown, Essay, 11; Winslow Papers, 499; Johnston, N. A.; important notes in *St. John Sun*, November 12, 1883).

Richibucto Village,—Kt. Important early Acadian farming and fishing settlement, formed in 1790 by Joseph Richard and several Acadian families from St. Pierre and Miquelon. It has grown steadily to the present, extending to other parts of Kent. (Hist. by Gaudet in *Le Moniteur Acadien*, November 23, 1882—January, 1883; May 31, 1887, and following Nos.; Bourgeois, in the same, December, 1896; Plessis, 180; Cooney, 151).

Richmond,—Cn. Parish est. 1853; first settled at *Park's Hill* in 1814, by immigrants from Maine, and three miles east of Richmond Corner, by Isaac Smith, from the St. John, in 1816; later, numerous native settlers from the St. John, together with some Scotch immigrants at Richmond Corner, McKenzie Corner and North Richmond, some Irish at the Irish Settlement, some Americans along the western border and some English at Ivy's Corner and Plymouth, gradually filled up the parish, the great part of the population, however, resulting from expansion of the Loyalist and New England Settlements of the St. John. (Loc. inf.; Smith, Methodism, II, 261; Raymond, Carleton County, and *St. John Telegraph*, September 7, 1887).

Richmond Corner,—Cn. Earlier called Scotch Corner. Settled about 1822 by a few Scotch immigrants. The Quebec and St. Andrews railroad had its terminus here for a few years after 1862, giving it considerable temporary importance, but the track was taken up back to Debec when the Woodstock branch was built in 1868. (Loc. inf.; and as under the preceding).

River du Cache,—N. Early Acadian fishing and farming settlement, perhaps founded in 1761 by the families who wintered there in 1761-62 (Smet-hurst, 18), though this settlement is locally said to have been temporary, and its permanent occupation is said to have commenced about 1780 by the ancestors of the present residents. (Loc. inf.).

Riverside,—A. Settled first as an original part of *Hopewell*.

Rhomboid,—Kt. Former name for a number of settlements laid out in 1854 and 1863 under the Labour Act, and since settled, chiefly by Acadians, as noted under the present names of those settlements. (Adams, 21).

Roach Settlement,—Y. An expansion of *Cork*, now mostly abandoned. (Loc. inf.)

Robertville,—G. Recent Acadian settlement, formed 1879 under the Free Grants Act, and settled by expansion from neighbouring settlements. (Adams, 17).

Robicheau,—K. Former small Acadian village above the mouth of the Belleisle, destroyed in 1758 by Monckton. Apparently also called Belleisle. (Hist. Sites, 271).

Rockland,—Cn. Native farming and lumbering (mill) settlement, an expansion from the river St. John, formed about 1825. (Sketches of New Brunswick, 42).

- Rogersville**,—N. Parish est. 1881. Important recent native, chiefly Acadian, settlement, commenced in 1874 by workers of the I. C. R.; laid out under the Free Grants Act in 1876, and now a prosperous and expanding settlement. It was virtually founded by Father M. F. Richard. (Loc. inf.; Adams, 17).
- Rollingdam**,—C. Settled apparently before 1830 by expansion from the neighbouring Passamaquoddy settlements, with some later immigrants.
- Rose Hill**,—G. Apparently originally Scotch immigrant, formed after 1828, but now mostly occupied by French. (C. L. R.; Cooney, 196).
- Rothsay**,—K. Parish est. 1870. First settled at *French Village* in 1767 by Acadians, who, after 1787, removed to Madawaska; settled along the Kennebecasis and Hammond River by Loyalists in 1784-86, and in the interior by expansion of their descendants.
- Roxborough**,—A. Scotch immigrant farming settlement, est. about 1848 on the Shepody road. (Loc. inf.).
- Roxborough**,—W. Early name for some settlements near Moncton, used by Cockburn in 1827. (Cockburn, 42, 47).
- Ruisseau des Malcontents**,—Kt. Temporary Acadian refugee settlement in 1755-56, opposite Cocagne Island. (Gaudet, Ms.).
- Rusagonis Settlement**,—S. Settled by Loyalists in 1784, whose descendants have expanded up both branches of the stream. The mouth of this stream was granted in 1782 to pre-Loyalist settlers on the river (Hist. Sites, 334), but was chiefly settled by Loyalists.
- Sackville**,—W. Originally settled by the Acadians (at *Prée des Bourgs, Prée des Richards, Tintemarre, Wescah*) who were expelled in 1755. The modern settlement was founded in 1761 by an association of 25 families from Rhode Island, joined later by other New Englanders, who settled on the present site of the town. They were joined in 1772 and later by Yorkshire immigrants who purchased lands, and later by a few Loyalists and some immigrants from various sources. Favoured by rich salt marshes, central position and good communication, it has grown prosperously and expanded to other parts of the parish, to Dorchester, up the Petitcodiac Valley, from Baie Verte to Cape Tormentine, and along the north shore. (History by Milner in *Chignecto Post and Borderer*, Anniversary Number, September, 1895; Huling, in *Narragansett Historical Register*, April, 1889; Trueman, *Chignecto Isthmus*; Hist. Sites, 328; Gaudet, on French settlers, in *Le Moniteur Acadien*, March 1, 1887; Bill, *Fifty Years with the Baptist Ministers and Churches of the Maritime Provinces of Canada*, St. John, 1880, 27; *Chignecto Post*, October 19, 1876).
- St. Andrews**,—C. Parish est. 1786. Settled entirely by Loyalists, principally of the Penobscot Association.

The town of St. Andrews, on the site of the Indian village *Conosquamcook* and of a small settlement of the English period, was laid out in 1783 and settled by Penobscot Loyalists, chiefly from Castine. As the trading centre of the Passamaquoddy region and the shire town of Charlotte it grew steadily until, between 1840 and 1850, it was

second only to St. John in population and importance, but it has since declined, although within a few years past it is rising into favour as a charming summer resort. Has been the shire town of Charlotte since 1786. (History by Vroom, in *Courier*, LXX, LXXVIII, LXXXIII, XCIII, XCIV; special number of *Acadiensis*, July, 1903; Hist. Sites, 323, 340; Winslow Papers, 489).

- St. Annes**,—Y. Former considerable Acadian settlement on the site of Fredericton and vicinity, founded probably about 1731 by Acadians from the Peninsula of Nova Scotia, and occupied until it was burnt by the British in 1759, after which its inhabitants appear to have moved farther up the river to *French Village*, Crocks Point, etc., and ultimately, in 1785-86, to *Madawaska*, where they helped to found the Madawaska Settlement. (Hist. Sites, 270).
- St. Annes**,—Y. Former small Indian (Maliseet) reserve of 4 acres, established October 29, 1765, by the Nova Scotian Government to include the site of the Indian burial ground, supposed to have stood at or near Government House. It appears to have lapsed through neglect.
- St. Anns**,—M. Parish est. 1877. Settled first along the St. John about 1787 by Acadians from the lower river, with some Canadians from Quebec, forming a part of the Madawaska settlement. Their descendants have expanded to the backlands.
- St. Anns**,—G. Apparently an Acadian settlement, an expansion from Bathurst village. (Mention by Johnston, N. A., II, 10, and by Rameau, II, 280).
- St. Aubin**,—C. Former small French seigniorial fortified trading post at Passamaquoddy on a site unknown, founded about 1684 by Sieur St. Aubin, and abandoned after its destruction by Church in 1704. (Hist. Sites, 266, 307).
- St. Basil**,—M. Indian (Maliseet) reserve of 722 acres, established 1824, and occupied by a small permanent village on an old site earlier called *Madawaska*. (Perley, Ind., XCVI).
- St. Basil**,—M. Parish est. 1850. Settled first along the St. John at the village of St. Basil, about 1786, as a part of the original *Madawaska* settlement, which has expanded up Green river and to a part of the backlands.
- St. Charles**,—G. Early French (Jesuit) Mission, founded in 1634 on Miscou Island, or on the shores of Miscou Harbour on a site unknown; continued to exist until about 1662. (Hist. Sites, 296; history by Dionne, as noted under *Miscou*).
- St. Charles**,—G. Est. 1896 under the Free Grants Act. CVI).
- St. Croix Island**,—or *Isle de Sainte Croix* (in Maine). Important but temporary French settlement, formed by de Monts in 1604 on St. Croix (now Dochet) Island, this situation being chosen chiefly for its defensibility against Indian attack, as well as for its charming situation and the abundance of fish in the surrounding waters. An abnormally severe winter forced its abandonment in 1605. This settlement marks the beginning of the permanent occupation of North America, north

of Florida by Europeans. Though historically a part of Canada it fell to the United States in 1797 when the boundary commission fixed the mouth of the St. Croix at St. Andrews, for the channel passes to the eastward of it. (History fully treated by the present writer in "Dochet (St. Croix) Island," a Monograph, in these Transactions, VIII, 1902, ii. 127; Hist. Sites, 262).

St. Croix,—C. Parish est. 1874. Settled first along the St. Croix and Waweig in 1784-85, by the Penobscot Association of Loyalists, whose descendants have expanded somewhat to the interior. (History by Vroom, in *Courier*,

St. Croix,—Y. Small unoccupied Indian (Passamaquoddy) reserve of 200 acres, established December 12, 1881.

St. Croix,—Y. A small lumbering village, formed since 1870 at the crossing of the St. Croix by the C. P. Railway. It is on the site of the Indian village *kilmaquac*.

St. David,—C. Parish est. 1786. Settled first at the head of Oak Bay by the Penobscot Association of Loyalists in 1784-85, and in the interior by the Cape Ann Association at about the same time. These latter settlers were not Loyalists, but persons who came to try their fortune in a new country. (History fully given by Vroom, in *Courier*, CXVI; Stevens, Charlotte County, 17; Winslow Papers, 489; a book of poems, "Early Reminiscences a poem recounting incidents occurring in the youth of the author and describing country life in the Province of New Brunswick forty years ago," by Leonard Scott, New York, 1864, relates chiefly to life in this parish).

St. Francis,—M. Parish est. 1833. Settled first along the St. John, apparently between 1830 and 1840, by English-speaking settlers from the lower St. John, with, apparently, some Americans. They have since been joined by some Acadians, and the latter are now settling in the interior.

St. George,—C. Parish est. 1786. Settled first in 1784 along the Magaguadavic at and above the falls by a disbanded Loyalist regiment, the Royal Fencible Americans, whose descendants, with some later immigrants, have extended up the Magaguadavic. Later Scotch immigrants have settled at *Mascareen* and elsewhere. (History of the regiment, by Raymond, Coll. N.B. Hist. Soc., II, 217; location in Hist. Sites, 339 and Map 46; also Vroom, *Courier*. LXXIV; Winslow Papers, 490).

St. George Village has grown up at the fine water power at the lower falls which, earlier used for sawing lumber, has latterly been employed in working and polishing red granite.

St. Georges Town was laid out for the Loyalists on the peninsula northwest of Letang Harbour, was temporarily occupied by them, but later abandoned.

St. Hilaire,—M. Parish est. 1877. Settled first along the St. John at *Baker Brook* about 1820 by Americans and (apparently) settlers from the lower St. John. Later, the Acadians extended up the river and mingled with these settlers (who have become largely gallicized), and they have also expanded on the backlands, as noted under the respective settlements.

- St. Isidore**,—G. Recent Acadian farming settlement, laid out in 1867 under the Free Grants Act, and settled by expansion from the neighbouring older districts. Est. as a parish in 1881. (C. L. R.; Adams, 15).
- St. Jacques**,—M. Parish est. 1877. Settled first along the Madawaska, apparently by Acadians, as an expansion from the Madawaska settlement, and at *Silver Stream* about 1830 by Irish immigrants. The interior settlements are all Acadian expansion from Madawaska, as noted under their respective names.
- St. James**,—C. Parish est. 1823. Settled first in 1803 by Scotch immigrants at *Scotch Ridge*; the expansion of their descendants and other native settlers, with various later immigrants, have formed the other settlements, as noted under their respective names.
- St. Jean**,—J. The early French name for the settlements and forts at the mouth of the river *St. John*; also called by them *Menagouèche*.
- St. John**,—J. Loyalist city, laid out in 1783 (as the "Town of Parr") on the then unoccupied peninsula, and settled at once by several thousand Loyalists; incorporated as a city May 18th, 1785, when it was extended to include *Carleton*; and in 1889 the city of *Portland* was united with it. Lying at the contact of marine navigation with the river navigation of the great *St. John*, it has become the seaport for half New Brunswick, and has grown steadily, despite many difficulties and reverses, from its foundation to the present, adding to its population from many sources, notably from the later immigrants from Great Britain. The completion of the C. P. R. short line to Montreal has made it the present chief winter port of Canada. These advantages have made it the largest city and commercial capital of the province. The shire town of the county since 1786.
- (History mostly unwritten; a brief and general *Centennial Prize Essay on the History of the City and County of St. John*, by D. R. Jack (St. John, 1883), is its only history; sketch by I. Allan Jack, in *Canada, an Encyclopædia*, V; much valuable material has appeared in the local newspapers, especially some 14 articles by W. F. Bunting, in the *Sun*, February-May, 1888; *St. John Globe*, December 14, 1901, history of past 40 years).
- St. Joseph, Fort**,—Name of the old fort at *Nachouac*.
- St. Joseph**,—W. Acadian village, in which is established St. Joseph's College (Roman Catholic, Acadian, founded 1868). It is on or near the reputed site of the first Acadian settlement of Memramcook.
- St. Joseph**,—N. Recent Acadian farming settlement, established 1878 under the Free Grants Act, and being settled by expansion from the neighbourhood. (C. L. R.; Adams, 19).
- St. Leonard**,—M. Parish est. 1850. Settled first along the *St. John* by sundry native settlers and immigrants, joined later by Acadians from the Madawaska settlement above. The interior settlements are almost entirely Acadian expansion from the *St. John*.
- St. Louisa**,—G. Acadian farming settlement, established under the Labour Act in 1861, and apparently gradually settled by expansion from the neighbouring districts. (C. L. R.).

St. Louis,—Kt. Parish est. 1855 (called *Palmerston* until 1866). Settled first in 1790 by Acadians at *Aldouane* and somewhat later by them on the *Kouchibouguacsis*. These settlements have gradually expanded up those rivers and to the backlands.

St. Martins,—J. Parish est. 1786. Settled first at Quaco in 1783 by a disbanded Loyalist regiment, the King's Orange Rangers, and in the interior by native expansion and Irish immigrants, as noted under the respective settlements. At the mouths of the various rivers, and at *Martins Head*, are early tiny mill villages. (History of the regiment, by Raymond, in Coll. N.B. Hist. Soc., II, 218; location in Hist. Sites, 342, and Map 46).

St. Martin's village rose to importance between 1840 and 1850 as a shipbuilding centre. (*St. John Sun*, October 30, 1896).

St. Mary's,—Y. Parish est. 1786. Includes the early township *Newton*, and an early trading establishment *Monckton*, and an early French fort and Acadian settlement *Nachouac*. Its permanent settlement began in the English period with certain farmers and traders at the mouth of the Nashwaak, but its principal settlement was by soldiers of disbanded Loyalist and Scotch regiments, especially the Maryland Loyalists along the Nashwaak and the 42nd Highlanders. Many of the latter afterwards removed to the Miramichi, as did their descendants. The interior settlements are expansions of these or from other parts of the province, as noted under their respective names. (Winslow Papers, 497; Smith's Methodism, 91; History of the regiments, by Raymond, Coll. N.B. Hist. Soc., II, 210; location in Hist. Sites, 341 and Map 46).

St. Mary's village has largely grown up since the construction of the bridge across the St John, in part as a R.R. station and practically a terminus.

St. Mary,—Kt. Parish est. 1867. Settled chiefly by Acadians, an expansion from the older settlements of Kent.

St. Patrick,—C. Parish est. 1786. Settled first at the mouth of the Digdeguash by a few settlers in the English period, but its modern settlement began in 1784 when the Penobscot Association of Loyalists settled along Passamaquoddy Bay, and the 74th Highlanders, a disbanded Scottish regiment, settled on the Digdeguash. The descendants of these settlers, with some later immigrants, have expanded to the interior.

St. Patrick's village was, in the 30's and 40's, an important lumbering, mill and shipbuilding centre, but is now abandoned. (*Vroom, Courier*, XCV, CIII; Winslow Papers, 489).

St. Paul,—Kt. Parish est. 1883. Settled first about 1860 under the auspices of Bishop Sweeney of St. John, by Acadians from *Memramcook*, *Fox Creek*, *Cape Bald*, *St. Mary* and *Buetouche* and especially from Egmont Bay, Prince Edward Island. History of its origin in Rameau, II, 279; (Loc. inf.).

St. Peter's,—G. An old name for *Bathurst*.

St. Rose,—G. Est. recently under the Free Grants Act.

St. Stephen,—C. Parish est. 1786. Includes the site of an early French establishment *Chartier*, and the settlement of New Englanders at *Scoodic* (site of the present town). Its principal settlement, however, was by Loyalists; the present town and thence to the Old Ridge was settled by the Port Matoon Association of Loyalists, while Milltown and the river to Upper Mills were settled by the disbanded regiment, the 74th Highlanders, west of which and on Mohannes Stream were the Penobscot Association of Loyalists.

The town of St. Stephen, at first called *Morristown*, favoured by its position at the head of navigation and near the fine water powers at *Milltown* grew steadily; was incorporated in 1871, and has replaced its declining lumber traffic by some manufacturing.

(History by Vroom in *Courier*, LXXXV-XCII; Knowlton, *Annals of Calais, Maine, and St. Stephen, New Brunswick*, Calais, Maine, 1875; Winslow Papers, 489; *St. John Sun*, (Special No.), April 6, 1892).

Salisbury,—W. Parish est 1787. Settled along the main Petitcodiac, apparently between 1786 and 1800, by expansion from the lower parts of that river (especially *Hillsborough* and *Moncton*), and from *Sackville* and *Westmorland*; settled up Pollet river, Anagance, and North river, between 1800 and 1810, from the same sources, and in the interior by expansion from *Moncton*, with a later immigrant settlement at *Fredericton Road*.

Salmon Beach,—G. Early Irish immigrant settlement, formed between 1820 and 1830, under the same circumstances as the *New Bandon* settlement; settlers mostly from the south of Ireland. (Loc. inf.).

Salmon Creek,—Q. Native settlement, with some Scotch immigrants, formed about 1824 by expansion from the Washdemoak. (Loc. inf.).

Salmon Creek,—Q. (in Chipman). Irish immigrant, formed soon after 1820 by families from the north of Ireland. (Loc. inf.).

Salmonhurst,—V. Modern mill village, commenced by Americans. (Loc. inf.).

Samphill,—K. An expansion from *New Canaan* about 1830. (Loc. inf.).

Sapin Cape,—Kt. Also La Pointe au Grand Sapine. Acadian fishing village, formed prior to 1811 (in which year grants were made), probably as an expansion from *Kouchibouguasis*. (C. L. R.).

Saumarez,—G. Parish est. 1814. Settled first at the mouth of *Tracadie* river in 1784 by Acadians who, with a few English-speaking immigrants, have expanded up the *Tracadie* rivers and to the neighbouring backlands.

Scadouc,—W. The Acadian part of this settlement, two miles east of the river, was apparently settled about 1821. (C. L. R.).

Scoodic,—C. Former small Indian (Passamaquoddy) reserve of 120 acres at Salmon Falls, Milltown, established August 15, 1785, and apparently bought from the Indians by the Church in 1802.

Scoodic,—C. Small settlement of New Englanders on the site of *St. Stephen* (and the earlier French *Chartier*) commenced about 1770, numbering nine families in 1779 and granted lands with the Loyalists of St. Stephen. (Vroom, in *Courier*, LII; Hist. Sites, 323).

Scotch Glen,—Y. See *Tay Falls*.

Scotch Corner,—Cn. See *Richmond Corner*.

Scotch Lake,—Y. Early Scotch immigrant settlement, founded in 1820 by six families from Roxborough and Dumfries; it has grown steadily and expanded to the present. (Loc. inf.).

Scotch Ridge,—C. Early Scotch immigrant settlement, founded in 1803 by a corps of disbanded Highlanders, the Reay Fencibles, from Sutherlandshire. It has expanded to *Basswood Ridge*, *Pomeroy Ridge*, and *Oak Hill*; it is notable as being the earliest distinct immigrant settlement formed in New Brunswick away from navigable waters. (History by one of their descendants in *St. Croix Courier*, September, 1894; Stevens, Charlotte County, 16; loc. inf.; in Journals of the House of Assembly, 1805, it is said, "£134. 13s. 11¼d. has been appropriated to assist sundry emigrant Scotch families, in number 116, who have arrived in the County of Charlotte and expect allotments of land in that county").

Scotch Settlement,—Kt. An early extension of *Macdougall*.

Scotch Settlement,—K. Early immigrant Scotch settlement, formed in or before 1820 on the old Fredericton-St. John road by families from Perthshire. (Loc. inf.; C. R.).

Scotch Settlement,—Y. See *Maryland*.

Scotchtown,—Q. Loyalist farming settlement, formed in 1785 by sundry Loyalists, a number of whom were of Scotch descent. (Loc. inf.).

Second Wescock,—W. Irish immigrant and native expansion settlement, formed about 1825. (Loc. inf.).

Seely's Cove,—C. Small Loyalist settlement, formed in 1784 or 1785 by Justus Seely. (C. L. R.).

Semiwagan Ridge,—N. Irish immigrant settlement, formed about 1832, apparently by expansion from *Barnaby River*. (C. L. R.).

Shannon Settlement,—Q. Irish immigrant settlement, formed about 1829 by Shannon and other settlers from the north of Ireland. (Loc. inf.; Ward, 23).

Shannonvale,—R. Irish immigrant settlement, formed apparently after 1832. (Loc. inf.; Johnston, N. A. I., 413).

Shediac,—W and Kt. Small Indian (Micmac) reserve, not now occupied.

Also an early "Indian Fort" on the island in the harbour. (Hist. Sites, 292).

Former Acadian emigrant and refugee settlement, formed in 1750 and increased at the expulsion in 1755, probably at Shediac Cape and vicinity; the settlers were doubtless attracted here by the presence of the French fort erected north of the Shediac river in 1749; apparently temporarily abandoned after 1755. The permanent settlement began about 1767, when lands were assigned to them from Shediac Cape to Cocagne, including *Grandigue*, and their descendants have prospered and spread. The English settlement of the west side of the Harbour was commenced in 1785 by William Hanington, from London, who bought the lands here earlier granted to Colonel Joseph Williams,

and who was later joined by English-speaking settlers from various sources, including some Loyalists and immigrants from Great Britain, and the descendants of these settlers occupy these lands to this day, and have spread to other parts of the province. The Acadian settlements on the *Scadouc* and at *Barachois* were formed from 1800 to 1820, while the English settlements on the *Scadouc* are of later immigrant origin from the north of England, with a few from Ireland.

Shediac parish was est. 1827. The interior settlements are mostly Acadian expansion.

The village or town of Shediac was not established until after 1800, since which it has grown steadily, especially since 1860 when it became a considerable railway terminus, drawing settlers from various sources. (History by Gaudet in *Le Moniteur Acadien*, July 9, 1889, and March 4, 1890; March 4, 1886; Johnston, II, 63; Winslow Papers, 498; Gesner, 141; manuscript history by Judge Hanington).

Sheffield,—S. Parish est. 1786. Settled first along the St. John by New Englanders in 1763 as part of *Maugerville*, and around French Lake and Little river in 1784-85 by Loyalists, whose descendants have expanded somewhat to the interior; includes a former Acadian settlement at *French Lake*.

Sheila,—G. Post office name of a recent mill village, established by an American company. Also Tracadie Mills, or Fosters.

Shemogue,—W. Also Chimouguoue. Acadian farming and fishing village, founded about 1800 (granted about 1802), by settlers from Minudie, N.S. It is the most easterly Acadian settlement in the province, and beyond this point come English settlements. (Plessis, 184; loc. inf.).

Shepody,—A. Also Chipodi, Chipoudi, etc. Important early Acadian settlement, founded in 1698 by Acadians from Port Royal, who settled along the Shepody river, from near its mouth to German Creek, mostly on the north side, but they were all removed and their settlement destroyed by the English at the expulsion in 1755. In 1765 a Pennsylvania German settlement was formed at *Germantown*, later abandoned. Its modern settlement begins shortly after 1785, as noted under *Hopewell* and *Harvey*. (Rameau, I, 237, II, 333; Hist. Sites, 282; good account, though with some errors, in *St. John Sun*, April 5, 1893).

Shippegan,—G. Also Chipagan; and originally called the larger island of Miscou. Small Acadian settlement in 1761, somewhere near Shippegan Harbour. (Smethurst, 12).

Shippegan Village was first settled by three Acadian families near the present church,—probably about 1785.

Shippegan Island was first settled by N. Denys about 1652 at *Miscou* Harbour, but its modern settlement probably began with the location of P. du Clos and other Acadians at Alexander's Point, about 1790, since which time other Acadians from various sources have taken up lands at various places on the island, making its population almost entirely French, with only a few scattered English families, especially at Little Shippegan. About 1830 the Fruing Company, of Jersey, began their establishment at Alexanders Point, recently removed to L'Amec. The parish was established 1851. (Plessis, 108; Cooney, 179; Perley, 31; Winslow Papers, 501; loc. inf.).

- Shirley**,—S. Small settlement, formed prior to 1841 by James Shirley from Houlton, Maine, joined later by others. (Ward, 31; Gesner, 153; loc. inf.).
- Silver Stream**,—M. Chiefly Irish immigrant, formed about 1834-1839 (grants 1848), who came mostly via Quebec, but they have largely left the region. (Loc. inf.; Ward, 87, 88).
- Simonds**,—J. Parish est. 1839. Settled first on the Kennebecasis, the coast east of St. John and at Mispec, by Loyalists in 1783-84, and in the interior by their expansion and that of their descendants along the Westmorland and Loch Lomond roads, and by various later immigrants, as noted under the respective settlements.
- Simonds**,—Cn. Parish est. 1842. Settled first at the mouth of the *Presquile* by the military post established here in 1791, near which a few settlers from the lower St. John soon established themselves. During the next few years other settlers from the same source took up the lands, especially at the present *Florenceville*, along the St. John, and, after 1817, disbanded soldiers were settled above the *Presquile*. The back-lands have been settled by expansion from these settlements. (Important matter in Raymond, Carleton County, 75, 76).
- Sisson Ridge**,—V. Laid out for settlement under the name Tobique in 1856, but later included among the Free Grants settlements, and settled by natives of the province from the St. John river and elsewhere.
- Sisson Ridge**,—V. Native farming settlement, established before 1879 under the Free Grants Act, and settled by expansion from the neighbouring English settlements. (Adams, 30).
- Skedaddle Ridge**,—Cn. Settled first in 1864 by "Skedaddlers" (men who fled to escape the draft into the Union armies) and who returned after the close of the war to their homes. (Loc. inf.).
- Skinouboudiche**,—N. Former important Indian (Micmac) village, probably pre-historic, still occupied by the Micmacs at *Burnt Church*. The situation was central for the Indians of North-eastern New Brunswick and in a region extremely rich in game; hence its importance. A Mission was established here on land granted for the purpose by Richard Denys de *Fronsac* in 1685, and his own settlement was here or near by. (St. Valier, *Estat présent de l'Eglise*, 1688, page 32 of the Quebec edition of 1856).
- Smith's Creek**,—K. Loyalist expansion settlement, founded prior to 1790 by Isaiah Smith, joined later by other Loyalist settlers. Their descendants with some later immigrants have expanded up this stream to *Newton* and *Cornhill*. (History in *St. John Sun*, April 7, 1892).
- Smithfield**,—Y. Irish immigrant settlement, settled about 1839 by families from the north of Ireland. (Loc. inf.).
- Snider Mountain**,—K. Loyalist expansion settlement, formed about 1823 by settlers from Dutch Valley. (Loc. inf.).
- Southampton**,—Y. Parish est. 1833. Settled first along the St. John by a disbanded Loyalist regiment, the Pennsylvania Loyalists, and by Loyalist families at the mouth of the Nacawic. The interior settlements are

entirely native expansion, as noted under their respective names. (History of the regiment, by Raymond, in Coll. N.B. Hist. Soc., II, 209; location in Hist. Sites, 343 and Map 46).

Southesk,—N. Parish est. 1879. Settled first along the lower Miramichi, prior to 1785 by Scotch immigrants, who, joined by native settlers from other sources, have extended gradually some 15 miles up the little Southwest Miramichi.

Spearville,—Cn. Settled about 1855 by expansion from Nova Scotia, as was also Oak Mountain. (Loc. inf.).

Springfield,—G. Est. 1880 under the Free Grants Act.

Springfield,—K. Parish est. 1786. Settled first along the Belleisle by Loyalists in 1784-85; their descendants have expanded up the Belleisle Creek and to the adjoining backlands, as noted under the respective settlements. Along the northwest border are several immigrant settlements, as noted under their respective names.

Springfield Settlement,—Y. Native N.B. and N.S. Land Company settlement, formed about 1842 by expansion from Keswick Ridge. (Loc. inf.).

Springhill,—K. An expansion from *New Canaan*, about 1814. (Loc. inf.).

Spryhampton,—Q. Large estate on the St. John, in Cambridge, granted in 1774 to William Spry and temporarily settled soon after by tenants of his; later escheated and settled by Loyalists. (Hist. Sites, 326, 334).

Stanley,—Y. Parish est. 1846 (originally est. 1837, repealed 1838, re-established 1846). Settled first along the Miramichi Portage road by a temporary *military settlement*, after 1817, and a few other settlers, and at *Campbelltown* by native expansion about 1820, but elsewhere entirely by the N.B. and N.S. Land Company, immigrant and native settlements, after 1835. The village was founded in 1835 by the N.B. and N.S. Land Company and settled by them as a centre of their operations, mostly by English immigrants; now a prosperous mill village and farming centre.

(The history of the company and its early operations is fully given in Kendall, Reports I and II on the state and condition of the Province of New Brunswick, with some observations on the Company's tract, London, 1836; and some fine lithograph views of its early condition are shown in "Sketches in New Brunswick," London, 1836; Johnston, Report, 89; Gesner, 166; Ward, 57).

Steeves Mountain,—W. Early native settlement, founded about 1812 by expansion from the adjoining parts of the Petitcodiac, mostly by descendants of the original Pennsylvania German settlers of Moncton and Hillsborough. (Loc. inf.; Alexander L'Acadie, II, 109; Cockburn, 93).

Stonehaven,—Y. Scotch immigrant farming settlement, formed in 1873 on a Free Grants tract, as a part of the *Kincardine* settlement, by settlers from Stonehaven in Kincardineshire; a prosperous and progressive settlement. (Its history is fully given in much detail in Stevenson's Emigration Reports for 1873-74-75; Lugin, 82; St. John *Sun*, July 26, September, 1893; History of St. Andrew's Society, St. John, 105).

- Stone Settlement**,—Y. N.B. and N.S. Land Company settlement, formed by immigrants from Great Britain. (Loc. inf.)
- Studholm**,—K. Parish est. 1840. Includes a pre-Loyalist estate, *Studville*, but settled almost entirely by Loyalists along the Kennebecasis and by their expansion up Studholm's Millstream and Smith's Creek, while their descendants, with some later immigrants have settled the interior, as noted under the respective names of the settlements.
- Studville**,—K. Former name of the settlement about the mouth of Studholm's Millstream, founded by Major Studholm about 1786.
- Stymest Settlement**,—N. Formed 1814, or earlier, by Benj. Stymest, a Loyalist, (Loc. inf.).
- Sugary**,—N. Also Protectionville. Native farming settlement, established about 1878 under the Free Grants Act, and occupied by expansion from neighbouring parts of the province. (Adams, 18; loc. inf.).
- Summerfield**,—Cn. Native farming settlement, formed by expansion from the St. John about 1807. (Ward, 71). Earlier called Buber.
- Sunbury**,—Y. Township of the English period, granted 1765 to a company, but hardly at all settled, and afterwards escheated. (Hist. Sites, 326, 333; Coll. N.B. Hist. Soc., I, 109).
- Sunnyside**,—R. Native settlement, established 1876 under the Free Grants Act and settled by expansion from neighbouring settlements. (Adams, 13; C. L. R.).
- Sussex**,—K. Parish est. 1786. Settled along the Kennebecasis in 1784 and later by Loyalists, and up Trout and Wards Creeks, and in the interior by expansion of their descendants. With its rich lands and excellent communication Sussex is the most prosperous farming centre in New Brunswick. It was incorporated as a town in 1904. (History by Allison, in his "Rev. Oliver Arnold, first Rector of Sussex, N.B.," St. John, 1892; St. John *Sun*, August 24, 1904).
- Tabusintac**,—N. Also Taboujamtèque. Indian (Micmac) reserve of 8,007 (originally 9,035) acres, established February 18, 1802, but not now occupied. It formerly included outlying areas at McGray's or Wishart's Point (10 ac.), and at Ferry Point (25 ac.), these now apparently withdrawn. (Perley, Ind., CXIII, CXXVII).
- Settled first near the mouth of the river in 1798 by Scotch and Irish settlers from the Miramichi, joined later by others, and including a few earlier Acadians. The small Acadian settlements are mostly of later origin, apparently formed not long prior to 1812. (Loc. inf.; Cooney, 123; Plessis, 170).
- Tay Falls, or Scotch Glen**,—Y. An N.B. and N.S. Land Company settlement, formed about 1843 by immigrants from Great Britain. (Loc. inf.).
- Tay Settlement**,—Y. Early Irish immigrant settlement, formed in 1819, or soon after. (Loc. inf.).
- Tedish**,—W. Also Tédiche and Dediche. Acadian settlement, formed about 1810. (Plessis, 184, 254).
- Teetotal Settlement**,—Y. An early name for *Cork*.

- Temperance Vale**,—Y. Native farming settlement, formed by the N.B. and N.S. Land Company in 1861, and settled by expansion from older parts of the province. (Loc. inf.).
- Tetagouche**,—G. Settled at its mouth at Somerset Vale by Hugh Munro in 1794 (see *Bathurst*), and above by various Scotch and Irish immigrants, mostly after 1830; these settlers are being largely replaced by French. (Loc. inf.; Cooney, 195).
- Tilley**,—V. Native settlement, established 1873 under the Free Grants Act, and settled by expansion of Scotch, Irish and French settlers from the vicinity. (C. L. R.; Adams, 27).
- Tintemarre**,—W. Former Acadian village of considerable importance, with a church, on the site of Four Corners (*Sackville*), founded probably in the early 18th century by expansion from *Beaubassin* or *Beauséjour*, and destroyed by the British in 1755. (Hist. Sites, 281).
- Tobique**,—V. Large Indian (Maliseet) reserve with an important permanent village, containing 5,766 (originally 16,000) acres, established September 4, 1801, on petition of the Maliseet Indians. (Much on its history in Perley, Ind. XCIII; Sketches of New Brunswick, 41).
- Tobique**,—V. One of the tracts laid out for settlement in 1856, and gradually taken up by natives of the province. (Loc. inf.).
- Tobique River**,—V. Settled first between 1825 and 1830 by single settlers from the St. John, and later by a steady expansion from the native settlements of the St. John and other parts of New Brunswick, giving it a purely native population, which has extended from its mouth to the Forks, though thinly in places.
- Tracadie**,—G. Important Acadian settlement, founded in 1784 by Julien et René Robert, dit Le Breton, hunters, joined the next year by Michael Bastarache and other Acadians from Memramcook, the real founders. In 1786 two disbanded soldiers of Loyalist regiments, Ferguson and McLaughlan, received grants at the mouth of the Little Tracadie, founding the English-speaking part of this settlement. With rich fisheries and important lumbering interests, it has grown steadily to the present attracting many new settlers, both French and English, from various sources. (Gaudet, in *Le Courier des Provinces Maritimes*, September 21, 1882; January 17, 1895; *Le Moniteur Acadien*, April 16, 1889; *L'Évangéline*, November 17, December 1, 1892; Cooney, 176; Plessis, 163; Winslow Papers, 500; loc. inf.).
- Trafalgar**,—Kt. and W. One of the tracts laid out for settlement in 1856, but settled later under other names by Acadians.
- Trout Brook**,—M. Est. 1890 under the Free Grants Act.
- Trues**,—C. Former post-station on the old Fredericton-St. Andrews post road, one-half mile east of Piskahegan river, long since abandoned (though persisting on a map of 1900, in Sanford's Compendium, Canada).
The situation is well-known locally, and many stories cluster about it. Campbell, in his report on the military settlement on this road (see *Piskahegan*) gives a full account of this place. He says: "Josiah True was not a soldier, but a Provincial settler, that he had a farm of

100 acres, cleared and well cultivated, with comfortable buildings, a saw and grist mill at the Piskahegan Bridge, and a good stock of cattle, poultry, etc."

Tryon Settlement,—C. Irish immigrant settlement, laid out in 1838, and settled apparently in part by immigrants who came out to work on the St. Andrews and Quebec railway. (Loc. inf.).

Tweedside,—Y. An expansion from *Harvey*.

Tynemouth Creek,—J. Assigned to disbanded Loyalist soldiers in 1784, but probably settled later by Loyalist expansion of later immigrants. (C. L. R.).

Union,—C. An extension of St. Stephen; a mill village at Falls in the river. (Perley, Fisheries, 126).

Union Corner,—Cn. Settled after 1840 by immigrants from Maine. (Loc. inf.)

Union Settlement,—Q. Native farming settlement, formed about 1850 by expansion from the vicinity. (Loc. inf.).

Upham,—K. Parish est. 1835. First settled along Hammond river by Loyalist expansion about 1803, and in its remaining parts by the later expansion of their descendants. (Loc. inf.)

Upper Bay du Vin,—N. Irish immigrant farming settlement, established on the Chatham-Kouchibouguac road, soon after 1830. (Johnston, N. A., I, 111).

Upper Mills,—C. Included within the grant to the Penobscot Association of Loyalists, but settled later; it became, before 1830, a prosperous mill village at the Falls in the river. (Vroom, *Courier*, CVI; S. P. G. Report for 1836).

Victoria Settlement,—S. Native settlement, with some immigrants, laid out 1841, and settled chiefly by expansion from neighbouring settlements.

Villeray,—Q. Former small Acadian village at lower Gagetown, burnt by Monckton in 1758. (Hist. Sites, 271).

Wakefield,—Cn. Parish est. 1803. Settled first along the St. John, between 1790 and 1800, by expansion from Maugerville and the Loyalist settlements of the lower St. John, while all of the interior settlements are an expansion from these and from the same sources. The first of the interior settlements was at *Jacksonville*. (C. L. R.; loc. inf.; Raymond, Carleton County, 75).

Walker's Brook,—R. Trading post at the mouth of Walker's Brook, founded about 1766 by Admiral Walker as a branch of that at *Alston Point*, and destroyed by American privateers in 1776. (Hist. Sites, 330.)

Ward Settlement,—Y. An N.B. and N.S. Land Company settlement, formed about 1840 by English and Irish immigrants. (Loc. inf.).

Warwick,—N. Native farming settlement, established 1875 under the Free Grants Act, and sparsely settled by expansion from neighbouring settlements. (Adams, 20).

- Waterborough**,—Q. Parish est. 1786. Settled first along Grand Lake by Loyalists in 1784-85 and sparingly on the backlands by expansion of their descendants, with immigrants at *Marr Settlement*. (C. L. R.; loc. inf.).
- Waterford**,—K. Parish est. 1874. Settled first along Trout Creek by expansion of the Loyalist settlements of the Kennebecasis, and in its southern part by later immigrants, mostly Irish, as noted under the respective settlements. (C. L. R.; loc. inf.).
- Waterloo Settlement**,—Q. See *Irish Settlement*.
- Waterside**,—A. Settled about 1805, in common with much of *Harvey*, by natives of Nova Scotia. (Loc. inf.).
- Waterville**,—Y. Native settlement, formed about 1865 by expansion from neighbouring parts of the province. (Loc. inf.).
- Watson Settlement**,—Cn. Formed about 1828 or 1829 by immigrants from the north of Ireland. (Loc. inf.).
- Watt Junction**,—C. Settled first about 1853-54 by expansion from the older settlements in Charlotte; a junction since 1866. (Loc. inf.).
- Weldford**,—Kt. Parish est. 1835. Settled chiefly by English-speaking settlers, descendants of Loyalists and of Irish and Scotch immigrants, an expansion from the lower *Richibucto*. (C. L. R.; loc. inf.).
- Wellington**,—Kt. Parish est. 1814. Settled first at *Buctouche* in 1785 by Acadians, and later by English settlers, apparently an expansion from Cumberland and Westmorland, on Little River; the coast and backlands are mostly Acadian expansion, except at *Black River*, where there is a Scotch settlement.
- Welsford**,—J. Settled apparently first by expansion of the Loyalist settlements of the St. John, with probably some later immigrants.
- Welsh Pool**,—C. Settled first by David Owen in 1787; its situation made it the principal place on *Campobello* and has grown steadily, attracting settlers from various parts. (Loc. inf.).
- West Campbell**,—Y. One of the tracts laid out for settlement in 1856, but not settled.
- Westcock**,—W. At first a small Acadian village (*Wescak*, *Ouescak*), founded probably soon after 1700 by expansion from *Beauséjour*, and destroyed by the British in 1755. Its permanent settlement began with an expansion from Sackville, probably about 1770, to which were added some Loyalist accessions in 1784. (Hist. Sites, 280; loc. inf.).
- Westfield**,—K. Parish est. 1786. Includes the early French *Emenetic*, the later *Boishébert*, *Nerepis*, and *Glasiers Manor*. Its modern settlement, however, actually began with the settlement of Loyalists along the St. John and Kennebecasis in 1784 and later, while their expansion has settled the backlands. (C. L. R.).
- West Isles**,—C. Parish est. 1786. Settled first at *Indian Island* by New Englanders, and on *Deer Island* by various pre-Loyalist settlers. Several of the smaller islands were granted Loyalists, while others have been taken up by other settlers from various sources. (Various articles

in *Courier* Series; Winslow Papers, 490; valuable Ms. notes by McDonald, in C. L. office).

Westmorland,—W. Parish est. 1786, to include that part of the earlier township of Cumberland which fell in New Brunswick, for the settlement of which see *Cumberland*. It was the shire town of the county until 1801.

Whitehead Settlement,—Y. Established 1901 under the Free Grants Act.

White Settlement,—Kt. Also Le Blanc Village (?). Acadian settlement, formed before 1815 by expansion from older settlements in the vicinity. (Loc. inf.; C. R.).

White's Mountain,—K. Irish immigrant settlement. (Newspaper item).

Wickham,—Q. Parish est. 1786. Settled first along the St. John and Washdemoak in 1784-85 by Loyalists, and in the interior mostly by later Irish immigrants, as noted under the respective settlements.

Wicklow,—Cn. Parish est. 1833. Settled first along the St. John by a few scattered settlers from the lower St. John, between 1803 and 1815, and by disbanded soldiers of the *Military Settlement*, after 1817. The interior settlements were formed by expansion of these or by native settlers from the lower St. John.

Williamsburg,—Y. English immigrant settlement of the N.B. and N.S. Land Company, formed 1870 by a family from Yorkshire, who had first settled at Stanley. (Loc. inf.).

Williamstown,—N. Another name for *Ellenstown*.

Williamstown,—Cn. Native farming settlement, formed by expansion from the lower St. John before 1841. (Ward, 71).

Willow Grove,—J. A negro settlement, formed in 1817 by some 41 negroes, former Virginian slaves, who, during the war of 1812 had escaped to the British fleet in Chesapeake Bay, and were brought to St. John in 1815. They were assigned lots of 50 acres each at this location, but they have not prospered, preferring city life, and the settlement is in decline. (Journals House of Assembly, February 14, 1817, "Mr. Peters presented a petition of William Flood, on behalf of himself and 40 other black people, brought into this province by order of His Majesty's Government in the year 1815, praying aid to assist them in forming a settlement at Loch Lomond"; Johnston, N. A., II, 138; S. P. G. Report, 1826; Raymond, in "Neith," St. John, I, 27).

Wilmot,—Cn. Parish est. 1867. Settled entirely by expansion from the neighbouring settlements of the St. John and of the lower part of that river, after 1830. Its population is probably as purely of native Loyalist and New England descent as that of any parish in the province.

Wilson's Beach,—C. Early fishing settlement, founded in 1766 by Robert Wilson and other New Englanders, who settled here as squatters and ultimately acquired their lands by possession. It has grown and prospered to the present. (History by Vroom, in *Courier*, in XXXVIII; Coll. N.B. Hist. Soc., I, 211, 217).

Wilson's Point,—N. Site of the first English-speaking settlement of the *Miramichi*.

Windsor,—Cn. Native settlement, formed apparently before 1840 by expansion from the neighbouring parts of the St. John. (Ward, 73).

Woodlands,—Y. Native settlement, formed before 1849 and apparently an expansion from *Cardigan*. (Johnston, Report, 85).

Woodstock,—Cn. Parish est. 1786. Settled first along the St. John in 1784 by disbanded Loyalist regiments, the King's American regiment below Meductic, and Delancey's Brigade above it, and in the interior by expansion from these and other Loyalist settlements of the St. John. (History of the regiments by Raymond, in Coll. N.B. Hist. Soc., II, 203, 212; locations in Hist. Sites, 342, 343 and Map 46).

The present town of Woodstock, shire town of the county, has grown up with the lumbering industry on the Meduxnekeag since 1817, and as a farming and lumbering centre has grown to a prosperous town; incorporated 1856. It has been the shire town of Carleton since 1831. (Its history has been fully written by Raymond, in his Articles in the *Woodstock Despatch*, 1895 and 1896, and in *St. John Telegraph*, September 27, 1887; important matter in Baird's *Seventy Years*, 116, 355; Smith's, *History of Methodism*, II, 91; Winslow Papers, 484; *Fredericton Sentinel*, September 12, 1840; *St. John Sun*, September 21, 1904).

A small Indian (Maliseet) reserve of 200 acres, purchased by the Government, May 22, 1851, for the Indians of Meductic, and occupied as a permanent settlement by their descendants.

Wooler Settlement,—Y. An expansion of *Harvey*, formed about 1849.

Yoho,—Y. Settlement at the lake (Erina), founded prior to 1847 by one Chassey, a Canadian, and others. (Ward, 46).

Youghall,—G. Immigrant settlement, formed about 1830, in part by Irish Protestant and in part by Scotch settlers, on land thrown open for the purpose in 1825 by the escheat of the earlier grant to Allen of 1770. (Loc. inf.; Johnston, II, 14).

Zealand,—Y. N.B. and N.S. Land Company settlement, settled between 1845 and 1850 by settlers of Dutch descent from the United States, (Loc. inf.).

APPENDIX.

SOURCES OF INFORMATION.

The principal sources of information for this work are in large part stated in the discussion of the respective periods, supplemented by the introduction to the list of settlements and the Bibliography following, so that little additional comment is here needed.

The most important source of information by far for this subject is the collection of records in the Crown Land and Provincial Secretary's Offices at Fredericton. Of these records the most valuable are the *Council Records, Memorials of Applications for Land*, a series of volumes beginning with the foundation of the Province. For the dates of origins of settlements these are far more valuable than the records of grants of land, because the former show almost exactly when settlement was commenced, while the grants, being made at intervals of the most varying length after the actual settlement, give only an approximate idea. The Land Memorials are, however, from this point of view, faulty in two respects,—first, they do not include all settlements, omitting many of the most important, such as those of the large bodies of immigrants which were assigned to their lands by the Government, and second, they rarely or never tell the nationality or former homes of the applicants. Nevertheless, these memorials are of the utmost value in the study of the progress of settlement in New Brunswick, and the subject can never be thoroughly understood until they are exhaustively worked over from this point of view. I have myself been able, owing to limitations of time, to work them down only to about 1820, and even these not with the thoroughness I could wish. In order to supplement the data from these records and those of the Crown Land Office, I have attempted somewhat extensively to collect local information from those in the particular settlements likely to be best informed on their history. I have sent a great number of printed circulars as well as personal letters to postmasters and others, covering all of the New Brunswick settlements on which I had not definite information from other sources. Of course many of these were never answered, but the great majority were, and from them I have obtained a far greater amount of information than the plan of this work allows me to use here, but which I hope to make use of in the future. There is, however, one great drawback to this information. Being largely traditional it has all the indefiniteness, inaccuracy and often positive error inseparable from such evidence, and it has to be used with caution and

checked carefully from other sources. It is particularly inaccurate in dates, and I have observed, curiously enough, where other means of checking the correctness of the dates is available, an almost constant tendency to make them too recent. All information, therefore, given in this work, which is marked by the letters *loc. inf.* (local information) is to be received with some caution, though I have only used such information when I am assured of its substantial correctness; and I have either rejected or expressed by appropriate words or symbols that which is doubtful. In addition to the circular letters, I have sent requests to various persons prominent in their localities for information about particular settlements, and I have received in some cases detailed manuscript histories of very considerable value. For such contributions I wish to express particularly my indebtedness and my grateful acknowledgments; to Judge Hanington for an account of Shediac, to Mr. H. A. Powell for Richibucto, to Mr. Oscar Hanson (some years ago) for the coast of Charlotte and St. John, Mr. W. A. Hoyt for Andover, Mr. W. A. Colpitts for Elgin, Hon. A. R. McClelan for material on Albert County, Rev. A. B. Murray for Stanley and vicinity, Mr. G. D. Steeves for Hillsborough, Mr. Murray Burtt for Jacksontown, Dr. Robert Nicholson for the Miramichi, Mr. A. J. Bourgeois for Cap Pelée and vicinity, and to M. Placide P. Gaudet for information about many Acadian settlements. There are many others also who have aided in but little less degree than these. In addition I wish to acknowledge also the kind aid extended always by Mr. Thomas G. Loggie of the Crown Land Office, who had made the invaluable records under his charge freely available to me, and has sent me information from them on numerous occasions.

The various printed works of value in this study are sufficiently noted in their proper places, but two deserve special mention here. First, of particular value for such purposes are the large scale county maps, of which those for Kings-St. John, Westmorland-Albert, Northumberland, York, and Carleton were published between the years 1862 and 1878. These give the names of every settler then in those counties, thus allowing migrations, etc., to be accurately traced. Second, there are the various series of articles on local history published in local newspapers, of which the most valuable are Vroom's on Charlotte County, in the *St. Croix Courier*; Raymond's on Carleton County, in the *Woodstock Despatch*; and Herdman's on Restigouche, in the *St. John Sun*; all of which are worthy of republication in more permanent form. Complete sets of these, of the maps above mentioned, and of the books in the Bibliography ought to be accessible to investigators in the Legislative Library of the Province, but alas! they are not.

In conclusion it should be stated that this Monograph completes the series originally planned to cover fully the historical geography of the Province of New Brunswick. During the progress of the later papers, however, a large amount of material, both corrigenda and addenda, supplementary to the earlier ones, has accumulated, much of it of great importance. All this material I propose now to offer in a supplementary paper as soon as practicable, which will definitely conclude this series.

The following list includes only those works cited many times in the preceding pages, those referred to but once or twice being fully described with the reference.

Adams, Hon. Michael.—Province of New Brunswick. Information for intending settlers, with a description and map of the settlements established under the "Free Grants" and "Labour" Acts, etc. Fredericton, 1879.

Archives.—Annual Reports on Canadian Archives. Ottawa.

Atkinson, Rev. Christ.—The Emigrants' Guide to New Brunswick, British North America. Berwick-upon-Tweed, 1842.

Baillie, Thomas.—An account of the Province of New Brunswick; including a description of the Settlements, Institutions, Soil and Climate of that important Province; with Advice to Emigrants. London, 1832.

Baird, W. T.—Seventy Years of New Brunswick Life. St. John, 1890.

Boundaries.—A Monograph of the Evolution of the Boundaries of the Province of New Brunswick. By the present writer. These Transactions, VII, 1901, ii, 139.

Brown, Hon. James.—New Brunswick as a Home for Emigrants. Third Prize Essay, St. John, 1860.

Cockburn, Colonel.—Two Reports on Emigration laid before the Colonial Department. British Blue Books, 1828.

C. L. R.—Abbreviation for Crown Land Records.

Coll. N.B. Hist. Soc.—Collections of the New Brunswick Historical Society. St. John, N.B., Vols. I and II (in part).

Cooney, Robert.—A Compendious History of the Northern Part of the Province of New Brunswick and of the district of Gaspé and Lower Canada. Halifax, 1832; reprinted at Chatham, 1896.

Courier Series.—See Vroom, J.

C. R.—Abbreviation for Council Record, Memorials for Land.

Gaudet.—Sundry articles in the Acadian newspapers, *Le Moniteur Acadien*, published at Shediac, N.B., *Le Courrier des Provinces Maritimes*, published at Bathurst, N.S. and *L'Evangeline*, published at Weymouth, N.S.; also numerous manuscript notes sent me by him.

Gesner, Abraham.—New Brunswick, with Notes for Emigrants, etc. London, 1847.

- Herdman.**—History of Restigouche. Published in the *St. John Sun*, February, 5, 6, 8, 1883.
- Historic Sites.**—A Monograph of Historic Sites in the Province of New Brunswick. By the present writer. *These Transactions*, V, 1899, ii, 213.
- Johnston, J. F. W.**—Notes on North America; agricultural, economical and social. 2 vols. Edinburgh and London, 1851.
- Johnston, J. F. W.**—Reports on the Agricultural Capabilities of the Province of New Brunswick. Second edition. Fredericton, 1850.
- Kendall, E. N.**—Reports Nos. 1 and 2 on the State and Condition of the Province of New Brunswick, with some observations on the Company's tract. London, 1836.
- Loc. inf.**—An abbreviation through this paper for local information gathered from residents, either in person or by letter.
- Lorimer, J. G.**—History of Isles and Islets in the Bay of Fundy, Charlotte County, New Brunswick, from their earliest settlement to the present time; including sketches of shipwrecks and other events of exciting interest. St. Stephen, 1876.
- Lugrin, Charles H.**—New Brunswick (Canada), its Resources, Progress and Advantages. Fredericton, 1886.
- Mann, John.**—Travels in North America. Glasgow, 1824. Also, *The Emigrants' Instructor*. Glasgow, 1824.
- McGregor, John.**—British America. 2 vols. London, 1832.
- Monckton, Col.**—Report of the Proceedings of the Troops on the Expedition up St. John's River in the Bay of Fundy, 1758. In *Coll. N.B. Hist. Soc.*, II, 165.
- Notitia of New Brunswick for 1836.**—By an inhabitant. St. John, 1838.
- Perley, M. H.**—A Handbook of Information for Emigrants to New Brunswick. London, 1857.
- Perley, Ind.**—Reports on Indian Settlements, by M. H. Perley. Appendix to the Journal of the House of Assembly, 1844.
- Perley, M. H.**—Reports on the Sea and River Fisheries of New Brunswick. Second edition. Fredericton, 1852.
- Plessis, Joseph Octave.**—Journal de deux Voyages apostoliques dans le Golfe Saint-Laurent et les Provinces d'en Bas, en 1811 et 1812. Le Foyer Canadien, 1865.
- Poirier, Pascal.**—Le Père Lefebvre et L'Acadie. Montreal. Second edition, 1898.
- Practical Information to Emigrants.**—London, 1832.
- Rameau, de Saint Pere, E.**—Une Colonie féodale en Amerique, L'Acadie (1604-1881), 2 vols. Paris and Montreal, 1889.
- Raymond, W. O.**—Carleton County. A series of 100 articles in the *Woodstock Despatch*, 1895, 1896. The numbers refer to these articles.

- Raymond, W. O.**—*St. John River. Glimpses of the past. Incidents in the history of the St. John River. A series of articles now appearing in the St. John Telegraph, and being reprinted in book form.*
- Robb, James.**—*Agricultural Progress. An outline of the course of improvement in Agriculture considered as a business, an art and a science, with special reference to New Brunswick. Fredericton, 1856.*
- Select Committee Report.**—*Report from Select Committee on subject of Crown Land Department, with evidence and documents connected therewith. Fredericton, 1861.*
- Sketches of New Brunswick.**—*By Peter Fisher. St. John, 1825.*
- Smethurst, G.**—*Narrative of an Extraordinary Escape out of the hands of the Indians in the Gulph of St. Lawrence. London, 1774.*
- Stevens, James G.**—*On the Agricultural History and Condition of Charlotte County. Prize Essay of the Provincial Board of Agriculture, Fredericton, 1861.*
- Smith, T. W.**—*History of Methodist Church in Eastern British North America.*
- S. P. G. Reports.**—*Reports of the Society for the Propagation of the Gospel in Foreign Parts.*
- Stevenson, Hon. B. R.**—*Report on Immigration to New Brunswick in the year 1872. Fredericton, 1873.*
Report to Immigration of New Brunswick in 1873. St. John, 1874.
Report on Immigration to New Brunswick in 1874. St. Stephen, 1875.
- St. John Sun.**—*The references (dates) in this, as in the other St. John newspapers, refer partly to the daily and partly to the weekly or semi-weekly editions.*
- Trueman, Howard.**—*The Chignecto Isthmus and its First Settlers. Toronto, 1902.*
- Vroom, J.**—*Articles upon the History of Charlotte County, New Brunswick, in the St. Croix Courier. St. Stephen, 1892-1893.*
- Ward, Edmund.**—*An account of the River St. John, with its Tributary Rivers and Lakes. Fredericton, 1841.*
- Wedderburn, A.**—*Statistical and Practical Observations relative to the Province of New Brunswick, published for the information of emigrants. St. John, 1835.*
- Winslow Papers, A. D. 1826 to 1876.**—*Printed under the auspices of the New Brunswick Historical Society, edited by Rev. W. O. Raymond, M.A. St. John, 1901.*

II.—*Shelley's Debt to Eighteenth Century Thought.*

By PELHAM EDGAR, Ph.D.

(Presented by D. C. Scott, and read June 22, 1904.)

Picture to yourself a wild-haired, bright-eyed youth of eighteen who at the beginning of Michaelmas term, 1810, had come up from Eton to Oxford. He is the heir to a baronetcy, and to many broad acres in Sussex. The circumstances of his life have surrounded him with every advantage that might lead to worldly place and power. He has but to follow in the beaten path of tradition, and from Oxford he will graduate into Parliament. Here his wealth, his talents, and his powerful support will swiftly bring him into prominence, and a peerage will lend dignity to his closing years.

Thus common sense and the opinion of the world would dictate, and such were the dreams no doubt that shaped themselves in the mind of his honest blundering father as he left the young Shelley within the walls of University College.

But common sense and the traditions of the world had small share in shaping the destiny of Percy Bysshe Shelley. Six months later he was expelled from Oxford as the author of an atheistic pamphlet. This was in March, 1811. In August of the same year he married, in a fit of freakish sympathy, Harriet Westbrook, the daughter of a London coffee-house keeper. "Her father," wrote Shelley, "has persecuted her in a most horrible way, by endeavouring to compel her to go to school. She asked my advice,—resistance was the answer—and in consequence of my advice she has thrown herself upon my protection."

This marriage, regarded by Shelley's family as a grave *mésalliance*, was answered by the only argument which the father now deemed feasible—a withdrawal of support. The Duke of Norfolk, whom the young Shelleys visited with their last guinea, now intervened on his behalf. The family thought that the time had come at last when Shelley might be expected to listen to the dictates of worldly prudence. The grandfather, Sir Bysshe Shelley, had possibly heard of Shelley's intention ultimately to divide his estate with his sisters, and the sister of his soul, Eliza Hitchener. Landed proprietors are not wont to contemplate such projects with complacency. A portion of the estate was already entailed upon Shelley. He now heard the rumour of a proposition whereby he might at once pass from penury to wealth,

merely by consenting to entail the estate upon his eldest son, or, in default of issue, upon his brother.

But Shelley had already drunk deep of the Godwinian philosophy. To allow the ties of relationship to prevail above the considerations of reason seemed to him a proposition little short of criminal. "I, like the God of the Jews," he wrote, "set myself up as no respecter of persons; and relationship is considered by me as bearing that relation to reason which a band of straw does to fire. . . . I am led to love a being not because it stands in the physical relation of blood to me, but because I discern an intellectual relationship."

With the utmost indignation he heard of the terms of the proposal. In a letter to Miss Hitchener he pours out his wrath without stint. "I have since heard from Captain Pilfold. His letter contains the account of a meditated proposal, on the part of my father and grandfather, to make my income immediately larger than the former's in case I will entail the estate on my eldest son, and, in default of issue, on my brother. Silly dotards, do they think that I can be thus bribed and ground into an act of such contemptible injustice and inutility; that I will forswear my principles in consideration of £2,000 a year; that the good-will I could thus purchase, or the ill-will I could thus overbear, would recompense me for the loss of self esteem, of conscious rectitude? And with what face can they make a proposal so insultingly hateful" (a proposal, it will be observed, that would raise him at once from penury to wealth, on condition that he should accommodate himself to a time-honoured custom). "Dare one of them," he continues, "propose such a condition to my face—to the face of any virtuous man—and not sink into nothing at his disdain? That I should entail £120,000 of command over labour, of power to remit this, to employ it for beneficent purposes, on one whom I know not—who might, instead of being the benefactor of mankind, be its bane, or use this for the worst purposes, which the real delegates of my chance-given property might convert into a most useful instrument of benevolence! No! This you will not suspect me of."

Without compromising his conscience, Shelley accepted an allowance of £200 a year, which by a re-arrangement of the estate was subsequently increased to £1,000.

It is needless to dwell upon any further details of Shelley's brief life. His desertion of Harriet and his elopement with Mary Godwin are indefensible from the standpoint of ordinary human morals. It is not my purpose to be his apologist here, nor do I desire to range myself upon the side of his hostile critics. But there is a subtle

problem to be discussed, and my object will be gained if I can reach even an approximate solution.

We have abundant testimony to the inherent beauty of Shelley's character. Gentle, sympathetic and generous to a fault, his worldly interests and his personal advantage he held as naught wherever there was a wrong to be righted, or some glaring injustice to be laid low. Quixotically chivalrous, he was upon occasion ingenuously cruel. He deserts Harriet Westbrook, yet apparently cherishes the most friendly feeling towards her. Travelling with Mary Godwin in France on his way to Switzerland, he writes to her in the most affectionate terms:

My dearest Harriet,—

I write to you from this detestable town: I write to show that I do not forget you: I write to urge you to come to Switzerland, where you will at last find one firm and constant friend, to whom your interests will be always dear—by whom your feelings will never wilfully be injured. From none can you expect this but me—all else are either unfeeling or selfish, or have beloved friends of their own.”

The rest of the letter is filled with little details (most interesting surely to Harriet!), as to what he and Mary were doing. And in the later Italian days Shelley, pouring out his soul to Emilia Viviani in surely the most ardent love poem of the English language, includes Mary with Emilia in an ideal community of three. Can naïveté farther go?

Is this problem then susceptible of solution—that a man who from his early youth is at war with his family and with society should still be benevolent, gentle, and disinterested; and that a man who abandons his wife to elope with a woman more capable of satisfying his intellectual sympathies, and afterwards worships, though in Platonic wise, at other shrines should be credited with being moved by virtuous inclinations?

I have dwelt thus particularly upon certain events which stand out boldly in Shelley's life, because in his case it is impossible to dissociate opinion and conduct. With Shelley to think was to act; and impulsive though his nature was, it is impossible to point to a single action of his life which had not the approval at once of his reason and his conscience. It is incumbent upon us therefore to investigate the genetic source of these opinions which swayed him so powerfully throughout his life.

Professor Dowden is not far from the truth in shouldering upon William Godwin the responsibility for all those acts in which Shelley contemptuously ignored the conventional standards of morality and

conduct. But the influence of Godwin was reinforced in the formative period of Shelley's career by such an imposing array of radical and subversive theories gathered from a variety of sources, that it would lead to a most incomplete result to confine ourselves solely to a consideration of the English philosopher's opinions.

A brief review of the tendencies of thought in England and France during the XVIII. century will assist us in our conclusions.

To England is due the honour of originating the theories that dominated that century of great ideas. Locke threw into the arena his strongly fortified negation of innate ideas, with the necessary consequence that all human qualities, intellectual and moral, were held to arise from sensation and from reflection acting upon sensation. Stripped of the orthodox theism which Locke had been careful to preserve, this new philosophy developed into the naked materialism of the Encyclopædists.

Again, Locke, and with Locke, Hobbes, was responsible for the fertile theory of an original compact whereby society was first constituted. Clothe this idea in the resounding paradoxes of Rousseau, and you are led irresistibly onward into the volcano furies of the French Revolution.

They were days of much significance in the history of French thought when Voltaire landed in England in 1726, still stinging with the unmerited disgrace of a whipping and the Bastille, and when Montesquieu, some three years later, sought a peaceful refuge there for the indulgence of his philosophical meditation. They left their country with vague inclinations and unformulated tendencies of thought; they returned enriched and emboldened by fruitful contact with English ideas and with English institutions. Voltaire nourished his mind at the sources of Deistic thought, while Montesquieu, keenly scrutinising our system of popular government, elaborated the more sober theories of his admirable political writings.

These two great names dominate the earlier movement of reform in France. Neither displays a spark of the incendiary fervour of the later revolt. In the sphere of politics the more specious and inflammatory doctrines of Rousseau were soon to be substituted for the calm deliberations of Montesquieu; while Voltaire, who still lived and desired to dominate the new period as he had dominated the old, threw the reins on the neck of prudence, and spurred into the fray in the forefront of battle. Yet even he, the self-constituted captain of revolt, was rudely jostled by the fiery youth who pressed about him clamouring for a more uncompromising leader. "That poor deist Voltaire, he still believes in God." This phrase, spoken in scorn and pity, reveals

the rapid growth of radicalism in France. Voltaire's radicalism was never, it is true, displayed in the field of politics, but in matters of faith and religion his scepticism has not in recent times, at least, been stamped as timid and ineffectual.

But in politics and in religion the advanced position was held by Diderot and his fellow Encyclopædists. They gave no quarter and they asked for none, and blithely hurled their shot and shell into the broken ranks of a retreating enemy. Their victory was cheaply won. The stronghold of orthodoxy in France was well nigh defenceless. In the ranks of the clergy only the name of the Abbé Guénée is to be noted, and after the death of d'Aguesseau in 1751 the orthodox laity was defenceless for half a century, until Joseph de Maistre raised his voice in protest against a godless age.

It is interesting to note under what different conditions the contest was waged in England. There the intellectual forces of the nation were arrayed on the side of orthodoxy. Swift poured out the vials of a more than Voltairan irony upon the enemies of the church. Pope pilloried the hapless rank and file in the pages of the *Dunciad*. Johnson swelled large with vituperative scorn when sacrilege approached. The greater philosophical minds of the century also lent their powerful aid in support of the established faith—the sagacious Bentley, Berkeley, keenest of English metaphysicians, and Locke, the intellectual law-giver of the day. The only notable names that grace the other side were Shaftesbury, Mandeville and finally Bolingbroke, whose attack was wanting in vigour and directness.

In the sphere of politics, also, radicalism growled in corners. The accretion of generations had developed a constitution which foreigners viewed with envy. The fierce disputes of the preceding century were at an end, and a corrupt oligarchy, called parliament, shared the supremacy of power with a king no less corrupt. Whig and Tory sipped their port in their armchairs, and political enthusiasm was reserved for a loyal little band of Scotsmen, who did not indeed make the air resound with abstract political theories, yet knew how to fight and die for a despairing cause.

Turn we to France where the seed wafted across the Channel in the earlier days of the century was germinating for a bloody harvest.

The Germans have accused the French Encyclopædia philosophers of shallowness, of a desire to popularize and disseminate incendiary ideas. They stand open to the charge. In the XVIII. century, literature was a weapon. Beauty and depth were little prized beside a trenchant clearness of expression. In art the importance of these

former qualities is unquestioned, but their controversial value may be doubted. But to return to the German charge. Condillac, or the Abbé de Condillae, to give him a title that sat lightly upon him, was not a mere popularizer. He loved philosophy for its own sake. A devoted adherent of Locke, he proceeded, like Hume in England, to carry the ideas of Locke to their necessary conclusion. Locke had found the source of our ideas in reflection operating upon sensation, but had scarcely told us how we reflect. Condillac boldly enough makes all the faculties of the mind originate in sensation alone. To enforce his theory he assumes the existence of a statue without and within shaped as we are, and possessing all our organs of sense. These senses he then awakens in succession, beginning with smell as being the most rudimentary, and ending with touch, the sense whereby we perceive our distinction from the external world. From sensation he thus deduces all the faculties of the mind.

This animated statue is eminently characteristic of XVIII. century habits of thought, which conceived man as a mechanical automaton, guided infallibly by the omniscient sway of reason, and unmoulded by the multitude of impalpable forces which play upon him from birth to death.

Helvétius' book "*De l'Esprit*" has been characterized by Turgot as "a book of philosophy without logic, literature without taste, and morality without goodness." Helvétius was born of German parents in 1715, and amassed great wealth in France, the country of his adoption, as a farmer-general of the revenue. Tradition credits him with having sheltered Prince Charles Stuart for the space of two years. Our interest in him is not sentimental, however, and save for that one incident his history is thoroughly unromantic. Several theories that were probably in the air are consolidated in his book. He proceeds from Locke, Condillac and the sensational school, but superadds a political aim. Man, since nothing is innate, possesses no original proclivities for evil. His judgment is open to error through the passions or ignorance, and error it must be the function of education to eliminate. Now, as Helvétius sees in self-interest, or the pursuit of happiness the supreme motive to human action, it must be the duty of education to make self-interest square with virtue and the common weal. Further, it is clear to our philosopher that traditional laws are the barrier to public welfare, and that kings and priests, whose interests are traditional, are obstacles in the path of progress. Therefore it is only too evident that ancient laws and customs, royalty and priestcraft must be ruthlessly swept aside. Here we have then for the first time the theory boldly and distinctly enunciated that the laws

of a country are responsible for the crimes and errors of individuals. The principle that general utility is the foundation of morality bore fruit in the later utilitarian movement, whose leader, Bentham, acknowledged his full indebtedness to *Helvétius*.

The Baron d'Holbach, like *Helvétius*, was a German by birth and a Frenchman by education. Like *Helvétius* also he was possessed of large means, and his hospitable board was a rallying point for the bolder thinkers of the day. His famous book, "*Système de la Nature*," appeared in 1770, and startled the world by its boldness. Goethe records in his autobiography (book xi.) the shudder of horror he experienced upon reading the book. "How hollow and empty did we feel in this melancholy, atheistical half-night, in which the earth vanished with all its images, the heaven with all its stars. There was to be a matter existing from eternity, and eternally moved, and by this motion to right and left and in every direction—by this and no more—it was to produce the infinite phenomena of existence. Even with all this we might have been satisfied, if the author, out of his matter in motion, had really built up the world before our eyes. But he seemed to know as little about nature as we did; for, having set up some general ideas, he quits them at once, in order to change that which seems higher than nature, or as a higher nature within nature, into dull material nature moved indeed, but without direction or form; and thus he fancies that he has gained something important." From Goethe's words we perceive the utter materialism of the doctrine. Matter and motion are the only forces which operate in the universe. Man and the soul of man are merely fortuitous combinations of molecular atoms. Moral freedom is annihilated, and a stern necessarianism rules in its stead. Immortality is stigmatized as a foolish dream, and that the soul should survive is as probable as that a clock will strike the hour after it has been shivered into a thousand fragments.

All these doctrines d'Holbach expounds with a calm, cold assurance. The nearest approach to fervour is found when he proceeds to the attack of human institutions. "Opinion believes itself to be universally interested in maintaining received opinions; the prejudices and the errors which she judges necessary to assure her power are sustained by force, which never reasons. Princes, themselves filled with false ideas of happiness, power, grandeur and glory, are surrounded by flattering courtiers, whose interest it is never to undeceive their masters; these debased men never know virtue save to outrage it, and by degrees they corrupt the people, which sees itself obliged to lend itself to the vices of greatness, and considers it a merit to imitate it in its disorders."

Courts are the true centres of the corruption of nations." The theme is always the same, though the emphasis may vary.

Rousseau's position among this incendiary group of writers is an anomalous one, and more especially in regard to the permanency of his influence upon Shelley. Long after the poet had burst the shackles of the dull theories of the materialists he continued to read Rousseau with delight. With Byron, Rousseau's "Héloïse" in hand, he traversed the scenes hallowed in their eyes by the guilty passion of Julie and St. Preux; and in the great poem left fragmentary by his death Shelley allows Rousseau to interpret for him the meaning of the visionary throng chained through their passions to the car of life. Rousseau, whose quivering sensibilities had forbidden him the mastery of himself, has been conquered in the strife:

"I was overcome
By my own heart alone, which neither age,
Nor tears, nor infamy, nor now the tomb,
Could temper to its object."

In Rousseau's fate Shelley foresaw his own. That degree of wisdom at least he had attained before he died.

From Rousseau, the prophet of the Natural Religion, Shelley could derive nothing of the arid materialism of his earlier years. But to Rousseau, the individualist and the exponent of passionate love, to Rousseau, the great precursor in France of lyrical Romanticism, Shelley and the world owed much, however we may question the value of the debt.

If we omit the customary arraignment of kings, and the denunciatory objurgations levelled at the luxury of a corrupt civilization, there was little in the specious theories of Rousseau to which Shelley gave unquestioned adherence. Shelley, in common with the revolutionary writers, looked confidently forward to a period when, law and custom having been abolished, the world would enter upon a heritage of perfection. Rousseau perversely placed this period of perfection in the childhood of the race. Shelley, on the contrary, subscribed to the glowing picture which Condorcet drew of the happy future of humanity. "No boundaries are set to the improvement of the human faculties; man's perfectibility is really indefinite . . . then will arrive a moment when the sun will shine upon free men only, who recognize no other master than their own reason; when tyrants and slaves, priests and their stupid or hypocritical instruments will exist only in history or

upon the stage." Rousseau, on the contrary, saw in the progress even of a kingless civilization only further inducements to vice and misery.

We now come to the English philosopher who gathered up these various theories and welded them into a closely reasoned system of thought. William Godwin's fame is now obscured. His commanding, though transitory, influence among his contemporaries is unquestioned, and the sway which this cold and pedantic philosopher exercised over Shelley's early opinions is one of the curious problems of literature. His chief book, the "Political Justice," was published in 1793. "No work," wrote Hazlitt, "gave in our time such a blow to the philosophical mind of our country as the celebrated 'Political Justice.' Tom Paine, in comparison with Godwin, was considered a Tom Fool, Paley an old woman, and Burke a flashy sophist." De Quincey, with less enthusiasm, gave similar testimony. "Godwin as a philosopher now forgotten carried one single shock into the bosom of English society, fearful but momentary." "Throw away your books of chemistry," was Wordsworth's advice to a young student of the Temple, "and read Godwin on Necessity."

If the serene equipoise of Wordsworth's nature was not undisturbed, we can possibly understand the delirious enthusiasm with which Shelley welcomed this new evangel. Already at Eton he had begun to read him with delight, and reinforced by the theories of the French materialists, Godwin's gospel of perfection was the inspiration of his early writings.

In Godwin we find a rehearsal of the several theories of nature and of government which we have already traversed. His ideas are the ideas of Rousseau, amended by d'Holbach, Helvétius, Hume and Hartley. What was most original in him was his temperament. As the late Sir Leslie Stephen has remarked, "Godwin was admirably fitted for that high post by the negative qualifications of placid temper and singular frigidity of disposition. He works out the most startling and subversive conclusions with all the calmness of a mathematician manipulating a set of algebraical symbols. He lays down doctrines which shock not only the religious reverence, but the ordinary conscience of mankind, as quietly as if he were stating a proposition of Euclid."

For Shelley, as I have said, the doctrines had a fatal fascination. Few poets have sought so persistently as he to penetrate into and through the secret mystery of things:—

"While yet a boy I sought for ghosts, and sped
Thro' many a listening chamber, cave and ruin,
And starlight wood, with fearful steps pursuing

Hopes of high talk with the departed dead.
I called on poisonous names with which our youth is fed,
 I was not heard—I saw them not—
 When musing deeply on the lot
Of life, at that sweet time when winds are wooing
 All vital things that wake to bring
 News of birds and blossoming,—
Sudden, thy shadow fell on me;
I shrieked, and clasped my hands in ecstasy.”

This was the shadow of Intellectual Beauty; but it is an anticipation by many years to ascribe this dignified conception to this early period of his development. The shadow that fell upon him was projected from the grosser theories of the French philosophers and their English interpreter, Godwin. Here Shelley found a temporary repose for his restless fancies. Here was an intellectual theory of the universe that afforded the solution to the riddle by the mere evasion of first principles. And if it be objected that so gloomy a philosophy affords but scanty nourishment to the aspirations of a poet, we can answer that the theory of material progress and human perfectibility, which is a constant element in that philosophy, offered a boundless horizon of hope in which enthusiasm might expand without restraint. Shelley, early in his brief career, rejected the materialist theory as at once false and pernicious, but never did an unbounded faith in the ultimate perfection of the race cease to inspire and sustain his verse.

When Godwin's once famous book made its first appeal to Shelley, the poet's mind was in that condition peculiar and perhaps proper to youth when relative truth is rejected as a timid evasion of the great reality, and when truth absolute alone has power to command our intellect and our enthusiasms. It is either truth absolute, inflexible, dogmatic that we discover in Godwin, or his book is nothing to the purpose. Analysis would be tedious, but reference to some of the more striking theories will not be superfluous to show how Shelley's conduct and his early opinions conform themselves to the precepts of this pernicious book.

Broadly speaking, the philosophy rests upon the already enunciated theory of Helvétius, that the laws of a country are responsible for the crimes and errors of individuals. Godwin constitutes in his ideal speculations an abstraction which he terms reason. Virtue is conformity with individual judgment, vice is the mere neglect to apprehend the just relations of things. Morality is therefore a mere calculation of consequences, and truth and reason properly displayed to a criminal

or misguided enthusiast will produce their irresistible effect. There is no such thing, of course, as relative reason. An opinion or action is right or it is not right. Let us apply these theories to a concrete instance. A missionary is convinced that it is right for him to go into the savage wilderness and spend his own life and a great deal of other people's money to gain perhaps one unstable convert. Now, the reasonable man, in Godwin's view, has of course rejected Christianity with the other exploded superstitions of the world. He is conscious that the missionary's point of view is unreasonable, not to say ridiculous or even vicious. Would Godwin undertake to convince the missionary of this in a day, a week or a year of irrefragable argument? He might convince a murderer of the *unreasonableness* of his action, and free him from the gallows to act more sensibly in future. Even then he might lapse again into intellectual carelessness, and the sage would require to have another argument with him. But I don't think that he would convince the missionary.

The world of wise men is now agreed that social convention is nothing if it is not the expression of the reasonable convictions of mankind, consciously or unconsciously moulded through the centuries. It is in a sort the accumulated wisdom of the ages as affecting the sphere of conduct. But to Godwin's stern and unbending individualism convention is a cowardly compromise with truth. My reason—so might his pupil in all loyalty argue—rejects the spurious claims of convention upon my obedience; and if my own calm judgment and my personal happiness command me to run away with your daughter, leaving my wife most carefully provided for, as the great philosopher Godwin, you will most reasonably acquiesce in my action. Godwin, to Shelley's surprise and distress, was far from displaying the appropriate philosophical calm upon this occasion, but we must do him the justice of stating that he continued to borrow from his self-imposed son-in-law the largest sums consistent with a reasonable view of the situation.

Until man becomes what he never will be, an isolated abstraction, it is folly to speak of abolishing all the traditional ties by which people have hitherto been bound together. By a clean sweep of custom, convention and tradition Godwin, and Shelley in his footsteps, was convinced that human society could be rearranged with the logical precision of a syllogism. He scarcely could have reflected to what state of moral anarchy the uncompromising individualism of his philosophy would inevitably lead. Until reason is absolute, until we see truth in its unimagined essence, convention must be the world's compromise with perfection. There is no danger that the man of genius will ever become its slave.

We would not exchange the erring, impulsive, generous-minded Shelley for some timid yet wholly respectable counterpart, and still it must always remain a matter for regret that the poet's judgment was ever clouded and his sense of reality darkened by such an emasculate and unpractical philosophy. Shelley, with all his humanitarian ardour, never succeeded in being thoroughly human in his poetry. He is the master, of course, of certain human passions in a lyrical way. Exquisite tenderness for the oppressed, burning wrath against the oppressor have never found more eloquent utterance, and he is one of the great love poets of our language. But always there is something hectic and unreal in his verse, and the human beings of his early poetry are the shadows on a wall, or at the best the incarnation of a single passion. *Julian and Maddalo*, *The Cenci*, *Charles I.*, and the poems *To Jane* mournfully point the way to a new growth of power in which Shelley would have preserved the ideal grace of his youthful verse combined with the human depth it lacks.

* * * * *

The doctrinaire and the ideal Shelley are subtly blended in the *Queen Mab* and *Laon and Cythna*. The point where idealism shakes itself free from materialistic dogma is indicated in the prose fragment on *Love*. The development of his own speculative faculty and the progress of his Platonic studies had then given his nature its true direction. dissolved the material universe in a mist of beauty, and turned him towards the contemplation of human life as an emanation of a supreme controlling power, whose image was ever dimly present in his mind. His formal abnegation of materialism is first avowed in his brief *Essay on Life* (1815), although the change dates back to 1814 at least:—"The shocking absurdities of the popular philosophy of mind and matter, its fatal consequences in morals, and their violent dogmatism concerning the source of all things, had early conducted me to materialism. This materialism is a seducing system to young and superficial minds. It allows its disciples to talk, and dispenses them from thinking. But I was discontented with such a view of things as it afforded; man is a being of high aspirations, 'looking before and after,' whose 'thoughts wander through eternity,' disclaiming alliance with transience and decay: incapable of imagining to himself annihilation; existing but in the future and the past; being not what he is, but what he has been and shall be. Whatever may be his true and final destination, there is a spirit within him at enmity with nothingness and dissolution. This is the character of all life and being. Each is at once the centre and the circumference; the point to which all things are referred, and the line

in which all things are contained. Such contemplations as these materialism and the popular philosophy of mind and matter alike forbid; they are only consistent with the intellectual system."

There are few instances in the history of genius of such a rapid unfolding of new powers as Shelley's brief life affords. He died at twenty-nine, and already he had lived through many philosophies. But more important than the knowledge gained from the world of books was the wisdom that came to him from his more normal relations with the world of men. History was no longer for him a mere hideous record of crime and blood. His fragment of a drama on Charles I., so quick and sympathetic in its insight into the past, is sufficient proof of this.

Those theories, too, which had come down to him from his earlier days underwent a noticeable modification. The frigid necessarianism which once held undisputed sway is now shorn of a portion of its power. In *Prometheus Unbound* Demogorgon the tremendous gloom, who represents immutable destiny, controls all things save the sovereign will of man.

And the first effort of the supreme human will must be directed towards a mastery of the unbridled passions of our lower nature:

"Man who man would be,
Must rule the empire of himself, in it
Must be supreme, establishing his throne
On vanquished will, quelling the anarchy
Of hopes and fears, being himself alone."

Nor was Shelley, as his ideas matured, held captive by the fallacy of Godwin and his French precursors, that laws alone are responsible for the ills of mankind, and that the removal of all restraint would inaugurate the reign of perpetual joy. In the *Prometheus Unbound* we might be led erroneously to that conclusion. But the peace for which the earth has yearned is not reached until through suffering the mighty Titan who represents mankind has attained the mastery of himself:

"To suffer woes which Hope thinks infinite;
To forgive wrongs darker than death or night;
 To defy Power, which seems omnipotent;
To love and bear; to hope till Hope creates
From its own wreck the thing it contemplates;
 Neither to change, nor falter, nor repent;
This, like thy glory, Titan, is to be
Good, great and joyous, beautiful and free;
This is alone Life, Joy, Empire and Victory."

III.—*The Jesuit Missions of Canada.*

W. H. WITHROW, D.D.

(Read June 23, 1904.)

The region between Georgian Bay and Lake Simcoe, which is now a rich agricultural district, was, three hundred years ago, the home of the numerous and powerful Huron nation of Indians. Much of this region is still covered with what seems to be a virgin forest, yet the plough and the axe of the pioneer often bring to light the relics of a former population, concerning whom local tradition is silent, and of whom the lingering red men of the present know nothing. Yet in the pages of history live the records of this lost race, written with a fidelity and vigor that rehabilitate the past, and bring us face to face with the extinct nation.

The forty annual volumes of *Relations des Jésuites* contain a minute and graphic account by men of scholastic training, keen insight, and cultivated powers of observation, of the daily life, the wars and conflicts, the social, and especially the religious condition, of this strange people. As we read these quaint old pages, we are present at the firesides and the festivals of the Huron nation; we witness their superstitious rites and usages, their war and medicine dances, and their funeral customs; and, at length, as the result of the pious zeal of the Jesuit missionaries, we behold their general adoption of Christianity and their celebration of Christian worship.¹

In the region between the Georgian Bay, Lake Simcoe, and the river Severn, in the year 1639, were no less than thirty-two Huron villages, with an estimated population of about thirty thousand. These villages were not mere squalid collections of wigwams, but consisted of well-built dwellings, about thirty or thirty-five feet high, as many wide, and sometimes thirty and even a hundred yards long. They were generally well fortified by a ditch, rampart, and three or four rows of palisades, and sometimes had flanking bastions which covered the front with a cross-fire. The inhabitants were not mere hunting nomads, but an agricultural people, who laid up ample stores of provisions, chiefly Indian corn, for their maintenance during the winter.

As early as 1626, Jean de Brébeuf, the apostle of the Hurons, had visited, and for three years remained among these savage tribes. On Kirk's conquest of Quebec he was recalled, but in 1634, accompanied by Pères Daniel and Davost, he returned under a savage escort to the temporarily abandoned mission. By a tortuous route of nine hundred

¹ The statements of this paper are taken, for the most part literally, from these *Relations*.

miles up the Ottawa, and through Lake Nipissing, French River, and the Georgian Bay, they reached the Bay of Penetanguishene. Over five-and-thirty portages, sometimes several miles long, often steep and rugged, through tangled forests and over sharp rocks that lacerated their naked feet, the missionary pioneers helped to bear their bark canoes and their contents. Fifty times they had to plunge into rapids, and, wading or stumbling over boulders in the rocky channel, to drag the laden boats against an arrowy stream. With drenched and tattered garments, with weary and fasting frames, with bruised and mangled feet, stung by mosquitoes and venomous insects, they had to sleep on the damp earth or naked rock. "But amid it all," writes Brébeuf, "my soul enjoyed a sublime contentment, knowing that all I suffered was for God."¹

Separated from his companions and abandoned by his perfidious escort, Brébeuf offered himself and all his labours to God for the salvation of these poor savages,² and pressed through the woods to the scene of his former toil. He found that Brulé, a fellow-countryman, had been cruelly murdered in his absence, and, with prophetic instinct, anticipated the same fate for himself, but desired only that it might be met in advancing the glory of God. Davost and Daniel soon after arrived, a mission house and chapel were built, and the latter decorated with a few pictures, images, and sacred vessels, brought with much toil over the long and difficult route from Quebec. Here the Christian altar was reared, surpliced priests chanted the ancient litanies of the Church, whose unwonted sounds awoke strange echoes in the forest aisles.

But, by weary years of hope deferred, the missionaries' faith was sorely tried. They preached and prayed and fasted, without any apparent reward of their labour. The ramparts of error seemed impregnable. The hosts of hell seemed leagued against them. The Indian "sorcerers," as the Jesuits called the medicine men, whom they believed to be the imps of Satan, if not, indeed, his human impersonation, stirred up the passions of their tribes against the mystic medicine men of the pale-faces. These were the cause, they alleged, of the fearful drought that parched the land, of the dread pestilence that consumed the people; the malign spell of their presence neutralized the skill of the hunter and the valour of the bravest warrior. The chanting of their sacred litanies was mistaken for a magic incantation, and the mysterious ceremonies of the mass for a malignant conjury. The

¹ "Mon âme ressentait de très-grands contentmens, considérant que je suffrois pour Dieu."—Brébeuf, *Relation des Hurons*, 1635, p. 26.

² "M'offris à nostre Seigneur, avec tous nos petits travaux, pour le salut de ces pauvres peuples."—Brébeuf, *Relation des Hurons*, 1635, p. 28.

cross was a charm of evil potency, blasting the crops and affrighting the thunder-bird that brought the refreshing rain.

The missionaries walked in the shadow of a perpetual peril. Often the tomahawk gleamed above their heads or a deadly ambush lurked for their lives. But beneath the protection of St. Mary and St. Joseph, as they devoutly believed, they walked unhurt. The murderous hand was restrained, the death-winged arrow was turned aside; undismayed by their danger, undeterred by lowering looks and muttered curses, they calmly went on their way of mercy. In winter storms and summer heat, from plague-smitten town to town, they journeyed through the dreary forest, to administer their homely simples to the victims of the loathsome small-pox, to exhort the dying, to absolve the penitent, and, where possible, to hallow with Christian rites the burial of the dead. The wail of a sick child, faintly heard through the bark walls of an infected cabin, was an irresistible appeal to the missionaries' heart. Heedless of the scowling glance or rude insult, they would enter the dwelling, and, by stealth or guile, they would administer the sacred rite which snatched an infant soul from endless perdition,—from the jaws of the "Infernal Wolf."¹

They shared the privations and discomforts of savage life. They endured the torments of filth and vermin; of stifling, acrid smoke, parching the throat and inflaming the eyes till the letters of the breviary seemed written in blood. Often they had no privacy for devotion save in the dim crypts of the forest, where, carving a cross upon a tree, they chanted their solemn litanies till, gnawed to the bone by the piercing cold, they returned to the reeking hut and the foul orgies of pagan superstition.

Yet the hearts of the missionaries quailed not; they were sustained by a lofty enthusiasm that courted danger as a condition of success. The gentle Lalemant prayed that if the blood of the martyrs were the necessary seed of the Church, its effusion should not be wanting. Nor did the mission lack in time that dread baptism. The pious Fathers believed that powers supernal and infernal fought for them or against them in their assault upon the kingdom of Satan. On the side of Christ, His Virgin Mother, and the blessed Gospel were legions of angels and the sworded seraphim. Opposed to them were all the powers of darkness, aided by those imps of the pit, the dreaded "sorcerers," whom Satan clothed with vicarious skill to baffle the efforts of the missionaries and the prayers of the holy saints. Foul

¹ "Ce loup infernal." Thus, as they phrased it, the dying infants were changed "from little savages to little angels." Of a thousand baptisms in 1639, all but twenty were baptized in immediate danger of death. Two hundred and sixty were infants, and many more quite young.

fiends haunted the air, and their demoniac shrieks or blood-curdling laughter could be heard in the wailing night-wind, or in the howling of the wolves down the dim forest-aisles. More dreadful still, assuming lovely siren forms, they assailed the missionary on the side of his human weakness; but at the holy sign of the cross the baneful spell was broken—the tempting presence melted into air.¹

Yet, with these intensely realistic conceptions of their ghostly foes, the Jesuits shrank not from the conflict with Hell itself. Emparadised in beatific vision, they beheld the glorious palace of the skies prepared, a heavenly voice assured them, for those who dwelt in savage hovels for the cause of God on earth. Angelic visitants, in visions of the night, cheered their lonely vigils, and enbraved their souls for living martyrdom.²

Nor were they without previsions of their future sufferings and of the manner in which they should glorify God. Many years before his martyrdom, Christ crowned with thorns and the blessed Virgin with transpierced heart appeared in a vision to Brébeuf, and revealed to him that he also should tread the thorny way of the holy Cross. Again, the Saviour, with an infinite compassion, folded him in a loving embrace, pardoned all his sins, and, with the assurance that he was a chosen vessel to bear his name unto the Gentiles, showed him how great things he must suffer for His name's sake.

In a transport of devotion the willing victim exclaimed: "Naught shall separate me from the love of Christ, nor tribulation, nor nakedness, not peril, nor the sword."³ His ardour for martyrdom rising into a passion he writes, "I feel myself vehemently impelled to die for Christ."⁴ Wishing to make himself a holocaust, says his biographer, and a victim consecrated to death and to anticipate the happiness of the fate that awaited him, he made a vow never to refuse the grace of martyrdom, but to accept the stroke of death with all the contentment and joy of his heart. "Yea, Lord," he exclaimed, "though all the torments that captives in these lands can undergo in their cruel sufferings should fall on me alone, I offer, with all my heart, to endure them in my own person."⁵

¹ Ragueneau, *Relation des Hurons*, 1649, p. 24. One chapter of the *Relations* is headed *Du règne de Satan en ces contrées*, which the simple Fathers designated the very fortress and donjon-keep of demons—"une des principales forteresses, et comme un donjon des Démones."

² *Relation*, 1649, p. 24.

³ Ragueneau, *Relation des Hurons*, 1649, p. 23.

⁴ "Sentio me vehementer impelli ad moriendum pro Christo." *Ib.* 18.

⁵ "Ouy, mon Dieu, si tous les tourmens que les captifs peuvent endurer en ces pays, dans la cruauté des supplices, devoient tomber sur moy, ie m'y offre de tout mon cœur, et moy seul ie les souffriray."—*Ib.* 23.

Indeed he sought by his rigorous penances to make his life a continuous martyrdom. Beneath his hair-shirt he wore an iron girdle, studded with sharp points. Daily, or more often still, he inflicted upon himself unsparing flagellation. His fasts were frequent and austere, and often in pious vigils he wore the night away.

Such enthusiasm as that of these impassioned devotees was not without its unfailing reward. Inveterate prejudice was overcome, bitter hostility was changed to tender affection, and the worn and faded black cassock, the cross and rosary hanging from the girdle, and the wide-brimmed hat of the Jesuit missionary became the objects of loving regard instead of the symbols of a dreaded spiritual power.

The Indians abandoned their cruel and cannibal practices. Many of them received Christian baptism. The little children were taught to repeat the Ave, the Credo, and the Pater Noster. Rude natures were touched to human tenderness and pity by the pathetic story of a Saviour's love; and lawless passions were restrained by the dread menace of eternal flames. Savage manners and unholy pagan rites gave way to Christian decorum and pious devotion, and the implacable red men learned to pray for their enemies.

That in some instances at least, the conversion of the Indians was not a merely nominal one but a radical change of character, is evidenced by the following prayer of a Huron tribe for their hereditary foes, the cruel Iroquois:—"Pardon, O Lord, those who pursue us with fury, who destroy us with such rage. Open their blind eyes; make them to know Thee and to love Thee, and then, being Thy friends they will also be ours, and we shall together be Thy children."¹ A more signal triumph of grace over the implacable hate of the Indian nature it is difficult to conceive. "Let us strive," exclaimed another convert, "to make the whole world embrace the faith in Jesus."

The scattered missionaries were reinforced by pious recruits drawn across the sea by an impassioned zeal that knew no abatement, even unto death. At almost every Indian town was a mission established and consecrated by some holy name. Thus in the northern half of what is now the county of Simcoe, were the missions of St. Michel, St. Joseph, St. Jean, St. Jean-Baptiste, St. Louis, St. Denys, St. Antoine, St. Charles, St. Ignace,² St. François-Xavier, Ste. Marie, Ste. Anne,

¹ "Seigneur pardonnez à ceux qui nous poursuivent avec tant de fureur qui nous font mourir avec tant de rage, ouvrez leurs yeux, ils ne voyent goutte; faites qu'ils vous connoissent et qu'ils vous ayment, et alors estans vos amys ils seront les nostres, et nous serons tous vos enfans." Vincent, *Relation*, 1645, p. 16.

² The frequency of this designation, throughout the whole of New France, attests the veneration in which the founder of the Society of Jesus was held.

Ste. Agnès, Ste. Catherine, Ste. Cécile, Ste. Geneviève, Ste. Madeleine, Ste. Thérèse, and several others.

The most important of these was that of Ste. Marie, established in 1640, on a small stream, now known as the river Wye, which flows into Gloucester Bay, itself an inlet of the Georgian Bay, not far from the present town of Penetanguishene. The outlines of the fortification, for it was both fort and mission, may still be traced amid the forest, which has long since overgrown the spot. A wall of combined masonry and palisades, flanked by bastions at the angles, enclosed a space of some thirty by sixty yards, containing a church, a mission residence, a kitchen, and a refectory. Without the walls were a huge house for Indian visitors, a hospital for the sick, and a cemetery for the dead. Sometimes as many as sixty white men were assembled at the mission, among whom were eight or ten soldiers, as many hired labourers, about a score of men serving without pay, and as many priests; most of the latter, however, were generally engaged in the various out-missions. The demands upon the hospitality of Ste. Marie were very great. As many as six thousand Christian Indians were lodged and fed in a single year. But the Fathers bestowed such care on agriculture, sometimes themselves working with spade and mattock, that in 1648 they had provisions laid up sufficient for three years. They had also a considerable quantity of live-stock, including fowls, swine, and even horned cattle, brought with infinite toil through the wilderness.

But this prosperity was destined to be rudely interrupted, and to have a tragic close.

The terrible Iroquois, who dwelt to the south of Lake Ontario, in what is now Central New York, the most warlike and cruel of all the Indian races, the scourge and terror alike of the French and English settlements, waged perpetual war against their hereditary foes, the Hurons. Urged by implacable hate, large war parties would travel on snow-shoes through a pathless forest for hundreds of miles to burn and destroy the Huron villages and indiscriminately massacre their inhabitants—not merely the warriors, but the old men, the women, the little children. No distance was too great, no perils too formidable, if they might only glut their thirst for Huron blood. Even a single Mohawk lurked for weeks near the walls of Quebec or Montreal, for the opportunity to win a Huron scalp.

With the persistence of a sleuth hound, a small war party of Iroquois travelled twenty days' journey north of the St. Lawrence in mid-winter to attack a Huron camp, and wantonly butchered its inhabitants. The ubiquitous and blood-thirsty wretches infested the forest; lay in ambush at the portages of the Ottawa and St. Lawrence, and sprang,

like a tiger on his prey, on the straggling parties of their foes. Their victims they tortured with demoniac cruelty. They hacked the body with knives and shells, scorched it with burning brands, and after, with fiendish ingenuity, exhausting every mode of suffering, in their unhallowed frenzy they devoured the quivering flesh. "They are not men, but wolves," said a wretched victim of their rage. The blood-curdling story of the tortures of Pères Bressani and Jogues reads more like Dante's distempered dream of the horrors of the Malebolgian abyss, than like the acts of human beings.¹

This tempest of heathen rage, in 1648, was let loose on the Christian missions. The storm burst on the frontier village of St. Joseph, situated not far from the present town of Barrie, Ont., on the morning of July 4th. This village had two thousand inhabitants, and was well fortified, but most of the warriors were absent at the hunt, or on distant journeys. Père Daniel, who for fourteen years had here laboured in the Gospel, arrayed in the vestments of his office had just finished the celebration of the mass in the crowded mission chapel, when the dread warwhoop of the Iroquois was heard. The painted savages rushed through the unprotected openings in the palisade, murdering all whom they met.

Unable to baptize separately the multitude who, hitherto impenitent, now sought this ordinance, Père Daniel dipped his handkerchief in water and, shaking it over the terrified crowd, exclaimed: "My brethren, to-day we shall be in heaven."² Absolving the dying, and baptizing the penitent, he refused to escape. "Fly, brothers," he cried to his flock. "I will die here. We shall meet again in Heaven."³ Boldly fronting the foe, he received in his bosom a sheaf of arrows, and a ball from a deadly arquebuse. "He fell," says the contemporary chronicler, "murmuring the name of Jesus, and yielding, joyously, his soul to God,—truly a good shepherd who gave his life for his sheep."⁴

Seven hundred persons, mostly women or children were captured or killed. The body of the proto-martyr of the Huron Mission was burned to ashes, but his intrepid spirit, it was believed, appeared again

¹ Bressani, in a letter to the General of his Order at Rome, apologized for the bad writing and the blood smears on the paper, by the statement that only one finger was left on his mutilated and unhealed hand. His ink was a mixture of gunpowder and water; his table the ground. Sometimes the victim would write his woes in his own blood on bark or beaver skin.

² "Mes Frères, nous serons aujourd'hui dans le Ciel."—Ragueneau, *Relation des Hurons*, 1649, p. 3.

³ "Fuyez, mes Frères. Pour moy ie dois mourir icy; nous nous reverrons dans le Ciel."—*Ib.*, p. 4.

⁴ "Il tomba prononçant le nom de Jésus, en rendant heureusement son âme à Dieu, vrayment un bon Pasteur, qui expose et son âme et sa vie pour le salut de son troupeau."—*Ib.*, p. 4.

among the living, animating their hearts to endure unto the bitter end. And not for one moment did they quail. "We cannot hope," writes Ragueneau, his companion in toil and tribulation, "but to follow in the burning path which he has trod, but we will gladly suffer for the glory of the master whom we serve."

The next act of this tragedy opens eight months later, in the early spring of 1649. A thousand Iroquois warriors had, during the winter, made their way from near the Hudson River, around the head of Lake Ontario, and across the western peninsula to the Huron country. The object of attack was the village of St. Ignace, situated about ten miles northwest of the present town of Orillia, Ont. It was completely surprised in the early dawn of March 16th, and taken almost without a blow.¹ All the inhabitants were massacred, or reserved for cruelties more terrible than death, save three fugitives, who fled, half-naked, through the snow to the neighbouring town of St. Louis, about three miles distant.

Most of the inhabitants of St. Louis had time to escape before the attack of the Iroquois, but about eighty Huron warriors made a stand for the defence of their homes. With them remained the two Jesuit missionaries, Jean de Brébeuf and Gabriel Lalemant, who, scorning to fly, chose the point of danger among their flock, standing in the breach, the one baptizing the catechumens, the other absolving the neophytes.² The town was speedily taken and burned. The Jesuits, however, were not immediately killed, "being reserved for a more glorious crown,"³ but were, with the other captives, driven before their exulting conquerors back to St. Ignace.

Now began a scene of fiendish torture. The missionaries, stripped naked, were compelled to run the gauntlet through a savage mob, frenzied with cruelty, drunk with blood. They received a perfect storm of blows on every part of the body. "Children," said Brébeuf to his fellow captives, "let us look to God. Let us remember that He is the witness of our sufferings, that He will be our exceeding great reward. I feel for you more than for myself. But endure with courage the little that remains of these torments. They will end with our lives, but the glory that follows shall continue forever."

The Iroquois, maddened to fury, tore off the nails of their victims, pierced their hands, lacerated their flesh. Brébeuf, of brawny frame, and iron thews, and dauntless bearing—the Ajax of the Huron Mission—was the especial object of their rage. On him they wreaked their most exquisite tortures. They cut off his lips, they seared his throat

¹ "Quasi sans coup férir."—Ragueneau, *Rélation des Hurons*, 1649, p. 10.

² "L'un étoit à la brèche baptisant les catechumènes, l'autre donnant l'absolution aux néophytes."—*Ib.* p. 11.

³ "Dieu les réservoir à des couronnes bien plus grandes."—*Ib.*

and bleeding gums, they hung a collar of red-hot hatchets around his neck. But he stood like a rock, unflinching to the last, without a murmur or a groan, his soul even then reposing on God, an object of amazement to even his savage murderers.¹

The gentle and delicate Lalemant they enveloped in bark saturated with pitch, which they fired, seaming his body with livid scars. As the stifling wreaths of smoke arose, he cried, "We are made a spectacle to the world, to angels, and to men." They then tore out his eyes, and seared the sockets with burning coals. In derision of the rite of baptism, which the missionaries had so often administered to others, their savage tormentors poured boiling water on their heads.

The dying martyrs freely pardoned their foes, praying God to lay not these things to their charge. After nameless tortures, the infuriated monsters scalped Brébeuf while yet alive, hacked off his feet, tore out his quivering heart, and drank his blood. Lalemant endured his sufferings for seventeen hours, and died by the welcome stroke of a tomahawk. Brébeuf's stronger frame succumbed to his more deadly wounds in less than four hours.

Intrepid and blessed spirits! In a chariot of flame ye passed from mortal agonies and the mocking of a ribald mob, to join the noble army of martyrs, to wear for evermore their starry and unwithering crown.

In their divine repose, writes their biographer, they say, "We passed through fire and water, but Thou hast brought us into a wealthy place."

The skull and other relics of Brébeuf are preserved at the Hotel-Dieu at Quebec, and are averred to have wrought miracles of healing, as well as the conversion of most obstinate heretics; but a more potent spell is that of his lofty spirit, his noble life, and his heroic death.

The night which followed this deed of blood was a night of terror at Ste. Marie, situated only six miles from St. Ignace. All day long the smoke of the burning village of St. Louis was visible, and Iroquois scouts prowled, wolf-like, near the mission walls. All that night and the night following, the little garrison of forty Frenchmen stood at arms. In the chapel, vows and prayers, without ceasing, were offered up. The Hurons rallied, and attacked the Iroquois in furious battle. But their valour was unavailing; they were, almost to a man, cut off.

The Iroquois in turn, panic-stricken, fled in haste, but not without a last act of damning cruelty. Tying to the stake at St. Ignace, the prisoners whom they had not time to torture, they fired the town, re-

¹ "Souffroit comme un rocher. Sans pousser aucun cry, estonnoit ses bourreaux mesmes; sans doute que son cœur reposoit alors en son Dieu."—Ragueneau, *Relation des Hurons*, 1649, p. 14.

treating to the music, delightful to the savage ear, of the shrieks of human agony of mothers and their children, husbands and their wives, old age and infancy, writhing in the fierce embrace of the flames!¹ The site of the hapless town may still be traced in the blackened embers, preserved beneath the forest growth of over two centuries.

The mission was wrecked. The Hurons were scattered. Their towns were abandoned, burnt, or destroyed, and themselves fugitives from a wrathful foe. "We are counted as sheep for the slaughter," writes the pious Ragueneau. The Fathers resolved to transfer the mission to the Grand Manitoulin, where they might gather again their scattered flock, free from the attacks of their enemies. They unhappily changed their destination to Isle St. Joseph, now known as Christian Island (probably from tradition of its Jesuit occupation), situated about twenty miles from the wrecked mission of Ste. Marie, and two or three miles from the mainland. They set fire to the mission buildings, and, with sinking hearts, saw in an hour the labours of ten years destroyed.

On a rude raft, near sunset, on the 14th of June, they embarked, about forty whites in all, with all their household goods and treasures, and after several days reached Isle St. Joseph. They built a new mission-fortress, the remains of which may still be seen. Here, by winter, were assembled six or eight thousand wretched Hurons, dependent upon the charity of the mission. The Fathers had collected five or six hundred bushels of acorns, which were served out to the perishing Indians, and boiled with ashes to take away their bitter taste. But the good priests found compensation in the thought that man shall not live by bread alone; and they sought unweariedly to break unto the multitude the bread of life. In their extremity the famishing creatures were fain to eat the carrion remains of dogs and foxes, and, more horrible still, even the bodies of the dead.

O, the long and dreary winter!
O, the cold and cruel winter!
O, the wasting of the famine!
O, the blasting of the fever!
Hungry was the air around them,
Hungry was the sky above them,
And the hungry stars in heaven.
Like the eyes of wolves glared at them!

¹ "Prenans plaisir à leur départ, de se repaistre des cris espouvantables que pousoient ces pauvres victimes au milieu de ces flammes, ou des enfans grilloient à costés de leurs mères, ou un mary voyoit sa femme rostir auprès de soy."—Ragueneau, *Relation des Hurons*, 1649, p. 13.

Before spring, harassed by attacks of the Iroquois and wasted by pestilence, half of the number had died. Day by day the faithful missionaries visited the sick, exhorted the living, absolved the dying, and celebrated the sacraments in the crowded chapel, which was daily filled ten or twelve times. Night by night, in frost and snow and bitter storm, through the livelong hours the sentry paced his weary round.

During the winter the Iroquois ravaged the mainland, burning villages and slaughtering the inhabitants. St. Jean, a town of some six hundred families, which had hitherto resisted attack amid the fastnesses of the Blue Mountains, not far from the present town of Collingwood, was taken and destroyed. Here Père Garnier, the scion of a noble family of Paris, shared the heroic fate of Daniel, the first martyr of the mission. He was slain in the act of absolving a dying Indian.

With the opening of spring, the pinchings of hunger drove the starving Hurons from Isle St. Joseph to the mainland. The relentless Iroquois were awaiting them. Of the large party who crossed but one man escaped to tell the tale of blood. The whole country was a land of horror, a place of massacre.¹ There was nothing but despair on every side. More than ten thousand Hurons had already perished. Famine, or an enemy more cruel still, everywhere confronted them. They resolved to forsake their country and to fly to some distant region, in order to escape extermination by their foes. Many of them besought the Jesuits to lead them to an asylum beneath the guns of Quebec, where they might worship God in peace. The Fathers consulted much together, but more with God,² and engaged in prayer for forty consecutive hours. They resolved to abandon the mission. Dread of the Iroquois hastened their retreat.

"It was not without tears," writes Ragueneau, "that we left the country of our hearts and hopes, which, already red with the blood of our brethren, promised us a like happiness, opened for us the gate of heaven."³ The pious toils of fifteen years seemed frustrated, but, with devout submission, the Father Superior writes, "Whom the Lord loveth He chasteneth." They were accompanied in their retreat, by way of French River, Lake Nipissing, and the Ottawa, by three hundred Christian Hurons, the sad relics of a nation once so populous.⁴ Along the shores where had recently dwelt eight or ten thousand of their countrymen not one remained.⁵

¹ "N'estoit plus qu'une terre d'horreur, et un lieu de massacre."—Ragueneau, *Relation des Hurons*, 1650, p. 22.

² "Nous consultations ensemble, mais plus encore avec Dieu."—*Ib.*

³ *Relations*, 1650, p. 26.

⁴ "Tristes reliques d'une nation autrefois si peuplée."—*Ib.*

⁵ "Il n'en restoit pas mesme un seul."—*Ib.*

The little band of fugitives sought refuge on the Island of Orleans, near Quebec. But even here they were pursued by the undying hate of the Iroquois, who again and again attacked the mission beneath the very guns of the fort. The surviving Hurons were dispersed in scattered groups far over the bleak northern wastes from the Saguenay to the Mississippi, and eventually disappeared as a distinct race. One band sought the aid of the powerful Ojibways, and confronted their merciless foe on the shores of Lake Superior, where a great battle was fought on the spot still known as Iroquois Point, otherwise "the place of Iroquois bones." A few families, the remnant of the once powerful Huron nation, still linger at Lorette, near Quebec.

Of pathetic interest is the specimen of the Huron language given in the Relations for the year 1641. This language, once the vernacular of a numerous and powerful nation, is as completely lost as that of the builders of Babel. In all the world is none who comprehends the meaning of those strange mysterious words. Like the bones of the diornis and the megatherium, this meagre fragment is the relic of an extinct race—the tombstone over the grave of a nation.

Yet the labours of the Jesuit missionaries have not been altogether lost. The lives of these devoted martyrs and confessors were a perpetual altar flame of self-sacrifice and self-abnegation, consuming the base and sordid elements of earth away, and developing an unsurpassed nobility of soul which is its own exceeding great reward. Through their efforts, also, multitudes of degraded savages were reclaimed from lives of utter barbarism and of pagan superstition and cruelty to the dignity of men, and not unfrequently to the piety of saints.

Of the little company of Jesuit missionaries, Pères Daniel, Brébeuf, Lalemant, Garnier, Garreau, Buteux, and Chabanet; and Goupil, Brulé and Lalande, lay labourers, died by violence in the service of the mission; De Noue was frozen to death in the snow; and Bressani, Jogues, Châtelaine, Chaumonot, Couture and others, endured tortures far worse than death.

He who reads the story of the self-denying lives and heroic deaths of these Jesuit Fathers, although of alien race and diverse belief, will not withhold the throb of sympathy for their sufferings and of exultation in their lofty courage and unfaltering faith. The imperishable record of their pious labours, of their sublime daring, of their inextinguishable love of souls, will be a perpetual inspiration to mankind.

IV.—*The Monument to Wolfe on the Plains of Abraham, and the Old Statue at "Wolfe's Corner."*

By P.-B. CASGRAIN, *Quebec.*

(Communicated by George Stewart, D.C.L., and read June 23, 1904.)

In a correspondence addressed to the Editor of *The Chronicle*, Quebec, July 8th, 1903, a loyal Englishman, of London, England, H. O. Mordaunt, Esq., as one of the thousand visitors to Quebec, praises this beautiful city, its unique panorama, fine buildings and statues, etc., but goes on to remark:—

"But will you allow a visitor from the Old Country to point out how, in one respect, Quebec has fallen far short of what might naturally have been expected of her. I refer to the column erected to the memory of Wolfe. A hero so illustrious in the Annals of the Empire, and associated at all times with the early history of Quebec, is surely deserving of something better than this insignificant and mutilated memorial, utterly dwarfed by the huge jail at its side, and not easily found, owing to the site selected being a side lane."

The truth of these remarks must be admitted to a certain extent. It may be said in extenuation thereof, that no appeal has ever been made to the public in general to raise funds for the purpose of erecting such a befitting monument on the Plains as one erected to Wolfe and Montcalm, in the Governor's Garden, in the year 1828.

The existing column, though modest in appearance, is not altogether unbecoming, when it is remembered that it was due to the public spirit and liberality of the few British officers serving in Canada, at the head of whom stood Sir Benjamin D'Urban, then Commander of the Forces therein, who had it erected in the year 1849, to replace the former dilapidated one, a truncated column, which was buried underneath, and which had been raised by Lord Aylmer in the year 1832, at his private expense.

Now that these Plains have lately been purchased by the Government of the Dominion, and have been given over to the city, they are, by express agreement, set apart as public domain for all time, with the view of making a park which shall be dedicated to the memory of the gallant foes who fought the celebrated battles thereon. Thus, the occasion is offered to take the proper steps to build, among others, a monument in keeping with the brilliant victory and glorious death of Wolfe; and more appropriate as commemorating the immense political results which followed this pregnant event in North America.

Furthermore, we may assert that, as an accompaniment of this gift, the patriotic intention of the Government of the Dominion was then expressed to ornament the park with appropriate historical memorials.

We may therefore anticipate that, under these favourable circumstances, an appeal to the public for this noble object would meet with general approval and a hearty response from every loyal British subject of the Dominion, and also from many true Englishmen abroad.

We may therefore hope that, within a reasonable time, Quebec will be able to boast of a monument on the Plains, comparable in style with the splendid and artistic monument to Champlain which now graces the Dufferin Terrace.

In the meantime, and in anticipation of carrying this idea into effect, we may be allowed to suggest three things, which must in due course be taken into earnest consideration:—

1st.—That the present column, marking the spot where, according to its inscription, *Wolfe died victorious*, ought not to be disturbed or replaced, as long as it shall last.

2nd.—That the proposed monument ought to be erected on the knoll where the Goal now stands, and as near as possible to the very spot where he fell, at the head of his men, wounded by the third and mortal shot, because this place is still more sacred than the other, where he was carried dying to the rear and expired after a few moments; and because it offers a better site as a dominant position for a lofty monument to be seen from the river.

3rd.—That, whatever be the style or design of this monument, it should be crowned or surmounted by a statue of General Wolfe; and this should be modelled from the best and most authentic portraits, paintings and engravings known of him, so as to render a truthful likeness and faithful resemblance of his person.

Among the number of these now extant, we make bold to indicate as the best and also the best known, the full-length one, with right arm uplifted, looking and pointing as it were towards Quebec, giving a correct profile, and moreover showing an excellent artistic design of his commanding attitude when he fell. This portrait is from a painting by Hervey Smith, his aide-de-camp, who was no mean hand at drawing and painting, and who had taken a sketch a few days before the battle with a view to the production of such a picture.

It is well known that, from olden times, Quebec had its statue of General Wolfe, and, as such, the first memorial to him in Canada; but few persons are aware that it was modelled from this painting when it was sculptured in wood in Quebec one hundred and twenty-five years ago. The conspicuous stand it occupied in a niche above the door,

on the second story of the corner-house of Palace and John streets, rendered it familiar to successive generations, and it attracted more general attention, owing to the fact that it was painted in vivid colours, representing exactly the full uniform of the General in 1759, and more especially on account of the tradition attached to it.

The origin of this statue deserves to be recalled on this occasion, because now is the time to follow the example of the true and loyal soldier, who not only ordered and procured this memorial of Wolfe, but, moreover, bought the house where he had it placed and where he intended it to remain for all time, as a tribute of love and admiration for the chief whom he had seen cut off in the prime of life on the battle-field.

Among the first English settlers in Quebec, immediately after the treaty of peace, we find, in 1764, the name of George Hips. Most likely he must have been one of the clansmen of the Fraser regiment, the 78th Highlanders, which was disbanded at Quebec in the fall of 1763. Hips (so he wrote his name) turned his claymore into a butchers' knife, got on very well in this other slaughtering business, and invested his earnings in real estate. He soon became a burghess of the town. He began early and carried on his trade until the year 1774, on a lot and house quite near the above-mentioned corner-house, and on the same side of John Street, now No. 60 (No. 2993 of the Cadastre), which he had bought from George Jenkins, master butcher, who was the owner of it in 1766, under a deed of conveyance from one Louis Aubry, before Panet, notary.

As in that year 1774, on February 3rd, Hips sold out to Henry Sweetland, it may be presumed he then abandoned his trade, and became thenceforth a burghess of the town.

We shall see that, in the meantime, he always kept alive the memory of the hero who had died on the Plains, and no doubt the empty niche which he could not help seeing every day gave him the idea of a fitting place for an effigy of Wolfe, if he could only procure one.

As both the corner-house and the statue referred to are closely linked together, a short notice of each may not be without interest on the present occasion.

This corner lot is situate within the domain of the Crown, and forms part of a piece of land acquired by the Hôtel-Dieu of Quebec from Dame Marguerite Couillard, widow of Sieur Nicholas Macquart, by deed dated 5th July, 1665, before Duquet, notary; the said widow holding the same from her mother by deed before the same notary of the 8th November, 1664.

Subsequently, in 1739, René Cartier had become owner of this corner lot, together with the two-storey house thereon erected, measuring thirty feet front on Palace Street (then rue des Pauvres), and thirty-four feet front on John Street; he also held the adjoining lot, containing forty-five feet additional, fronting on John Street. The first half he had acquired from Dame Agnès Chiquient, widow of Joseph Blondeau, by deed of the 31st August, 1730, before Pinguet, notary; and the other half by a conveyance from Joseph-Marie L'Escuyer, before du Laurent, notary, bearing date the 11th October 1730. Above the door, at the angle, a niche had been prepared for, and was occupied by the figure of a saint. This figure was taken away soon after the surrender of Quebec.

At the death of Cartier, in 1764, the property passed to Joseph Duval and Josephite Cartier, his wife, as heirs at law, and they sold it on the 5th July, 1771, by deed, before Saillant, notary, to one Duncan McCraw, a trader (*marchand-pacotilleur*), living in John Street.

McCraw sold to George Hips, said to be a master-butcher (*marchand-boucher*), but then a burgess of the town of Quebec, as appears by a notarial deed before M^{re}. Berthelot d'Artigny, on the 20th April, 1780.

Here, it must be mentioned, as it is in this deed, that the conveyance was so made in pursuance of a previous written agreement between the same parties, bearing date the 15th September, 1779, which was declared to be cancelled and void, in consequence of the sale so effected. This private document is not to be found, and most likely was then destroyed. But it will be referred to hereafter, because it was about this time the statue was being carved in order to be placed in the empty niche of the saint, on the corner, which had remained vacant since 1763; and had suggested to Hips, as already mentioned, the idea of its being a fit place in which to place the effigy of Wolfe, as deserving also, as he thought, of some sort of terrestrial worship.

On the 1st of May, following the sale, Hips took possession of the premises, and thus secured the niche as a permanent site for the statue, which he then installed therein.

Unfortunately, he did not long enjoy the pride and satisfaction of beholding the object of his soldier-like reverence, for he departed this life within the year. By his holograph will, dated 10th April, 1781, he appointed as his executors Godfrey King, Isaac Roberts and John Barnsley, who caused this document to be registered in the English record office of the Court of Prerogatives, at Quebec, the 2nd May, 1781.

As such executors, they obtained leave to sell, by judicial sale, *licitation*, all the real estate of George Hips, and on the 7th June, 1781, the Court adjudged, as part thereof, the above corner-house and lot to

Godfrey King, being the last and highest bidder, at £595—the whole without any reservation whatever, save and excepting the statue of General Wolfe, which clause reads as follows by the judgment of the Court:—“sauf et excepté la statue du Général Wolfe, qui est dans un des coins de la dite maison, et *tel qu'il a été requis par le dit George Hips de Duncan McCraw* par acte devant Mire Berthelot d'Artigny, “notaire, à Québec, le 20 Avril 1780.”

The wording of this clause, it must be observed, was thus specially added by the same notary, d'Artigny, who also was the attorney for the parties, and in that capacity was prosecuting the judicial sale before the Court.

It seems evident he was cognizant of the import and real intention of the parties as to the written agreement on the 15th September, 1779, between McCraw and Hips (not sufficiently explained in the deed), and from which may be inferred the placing of the statue in the niche from and at that time. But it is certain it was in its place during the life-time of Hips, and must have been ordered and finished before or, at least, during the year 1779.

Godfrey King sold the whole property in two lots, that is to say, the house called “Wolfe's Corner” to Henry Junken, on the 16th February, 1788, by deed before Descheneaux, notary, and the remaining part to John Rees, on the 12th February, 1791, by deed before the same notary. This second part was subsequently acquired by the same Henry Junken from Rees.

Ann Barbara Junken, widow of Henry Junken, and universal legatee of her late husband, sold the whole house and two lots to Cyriac Weippert, tavern-keeper, by deed before Voyer, notary, bearing date 7th July, 1810, with the exception of the statue of General Wolfe, reserved in the following terms:—“si ce n'est la statue du Général Wolfe, qui se trouve dans un des coins de la maison, laquelle est “*déclarée ne pas appartenir à la venderes-e.*” The old tradition that this statue could never be sold seems thereby confirmed.

The children and heirs of Weippert and of his wife, Madeleine Sylvain, divided the estate coming to them, by way of a judicial sale (*licitation*), on the 10th September, 1819, and Cyriac Weippert, the son, bought the corner lot, “la maison à l'enseigne du Général Wolfe,” for the big price of £3,010. The adjoining lot went to Benjamin Corriveau and Madeleine Weippert, his wife, and her sister.

Cyriac Weippert having become insolvent, the corner-house was seized and described as “la maison à l'enseigne du Général Wolfe,” and adjudged by the Sheriff of Quebec to François Corneau, on the 18th December, 1826.

The widow of the latter, Marie-Louise Dubois, who had also become widow of Joseph DeBlois, sold the house to Messrs. François Evanturel and Isaac Dorion, two brothers-in-law, by deed before De Foy, notary, on the 30th December, 1846; and they also acquired the adjoining lot from Corriveau and consors, on the 17th March, 1847, by deed before the same notary.

Their intention was to erect new buildings fronting the whole lots, and they are those to be seen at the present day. Dorion was a builder by trade, but he did not forget, be it said to his honour, to respectfully keep alive the tradition concerning the effigy of General Wolfe. He made in the same corner and in the third storey of the new building a convenient niche, wherein it was duly replaced.

Singularly enough, when Dorion was demolishing the old house, he found in it a coloured engraving (14.3 x 10 inc.), corresponding exactly to the coloured statue, and as if intended to accompany it. This peculiar relic went afterwards to the late Honourable Frs. Evanturel, co-proprietor, and is now in the possession of his son, Colonel Evanturel, of this city, who has gathered from his father much interesting information about the effigy of General Wolfe.

The origin and authenticity of this remarkable picture and engraving is apparent by the following engraved inscription thereon:—

“From an original picture in the possession of Hery. Smith, Esq.
——Rich. Houston, Fecit.

MAJOR GENERAL JAMES WOLFE.

Commander in Chief of His Majesty's Forces, on the Expedition against Quebec.”

“Printed for J. Bowles & Son, in Cornhill, Eliz. Bakewell & Parker, opposite Birchin Lane, in Cornhill, J. Bowles, in St. Paul's Churchyard and Robert Sayer, at the Golden Back, in Fleet Street.”

All these well-known names, coupled together, carry conviction of genuineness and authenticity.

It is evident, at sight, the colouring is hand-made, with the object of giving the colour and facings of Wolfe's military uniform, and this process has caused the painting to adhere to the glass covering it.

The singular coincidence of finding this picture in the same house as the statue, and the reproduction of the same likeness and colour, in both, being perfectly clear, make it very reasonable to presume that the painted engraving was procured at the time by or for George Hips

from the Old Country, and to serve as a model for the sculptor, and remained with the statue.

We have a clue as to this drawing as well as to the sculpture of the statue from the late Mr. James Thomson, Sr., whose name is a household word in Quebec, and who was a personal witness on the occasion, having had the direction of the work.¹

Here is what he says on this subject, as taken down by his son, James Thomson, Jr., assistant-commissary-general, from his father's mouth, on the 11th August, 1828. It is to be found in the collection, *Thomson MSS.*, vol. 1, p. 4, in the library of the Literary and Historical Society of Quebec.

As these notes have not been seen in print, they may as well be given here *in extenso*.—

“We had a loyal fellow in Quebec, one George Phipps (Hips), a butcher, who own'd that house at the corner of Palace and John Streets, still called “Wolfe's Corner,” and it happened to have a niche, probably intended for the figure of some saint; he was very anxious to fill it up, and he thought he could have nothing better than the statue of *General Wolfe*; but he did not know how to set about getting one. At last he finds out two French sculptors, who were brothers, of the name of Chaulette,² and he asked me if I thought I could direct them how to make the likeness of the General in wood. I said I would, at all events, have no objection to undertake it, and accordingly they, the Chaulettes, tried several sketches, but they made a poor job of it after all.

“The front face is no likeness at all, and the profile is all they could hit upon, and which is good. The body gives a poor idea of the General, who was tall and straight as a rush, so that, after my best endeavours to describe his person (and I knew it well), and for which purpose I attended every day at their workshop,³ which was in that

¹ Mr. James Thomson, Sr., was sergeant in the 78th (Fraser Highlanders), and served under Wolfe at Louisbourg and Quebec. He knew the General perfectly well, and used to speak of his kindness to all his men, and to him in particular, addressing them all in private as “*Brother soldier*.” When the Highlanders were disbanded, Mr. Thomson remained in Quebec, where he was employed in conducting divers military works. He died in 1830 at the ripe age of 98 years, leaving a most respected name.

² Thomas-Hyacinthe & Ives, menuisiers, fils de Pierre Chaulette, charpentier de vaisseaux, et de Marie-Catherine Laflèche. *Greffe de F. Têtu, notaire*, 21 avril 1812, et J. C. Panet, notaire, 1er octobre 1768. Ils étaient simplement sculpteurs en bois, et nos pas statuaires.

³ Mr. Thomson lived on the opposite side of the street, at the south-east corner of Parlor and St. Louis Streets; the workshop of the sculptors being situate where Mr. Campbell's stables are now erected, 45-47 St. Louis Street.

house in St. Louis Street, where the Misses Napier are now living (1828), and which is somewhat retired from the line of the street, the shop being itself in the projection wing. I say we made a poor General Wolfe of it.

"It has been several times pulled down by mischievous persons and broken and as often repaired by the several owners of the house, and much to their credit be it spoken, and still keeps its ground, and I hope it may do so until the monument is finished. (Wolfe and Montcalm, then being erected in the Governor's Garden).

"I suppose the original parts of the statue must be now as rotten as a pear, and would be moulded away, if it was not for their being kept so bedaub'd with paint.

"(The above frequently related to me by my father).

"J. Thomson, Jr."

Sir James LeMoine states that in fact the statue was modelled from drawings furnished by Mr. Thomson. *Histoire des Fortifications et des Rues de Québec*, p. 28.

It has no great artistic merit, but, viewed at a distance, it answered its purpose so well that it was ever looked upon as a cherished heirloom, belonging to the citizens of Quebec.

In 1838-9, some playful *middies* of the Royal Navy took down the statue in a youthful freak, and gave it a sea trip to Calcutta on a man-of-war, whence it came back with a broken arm.

Then it remained deposited for a time in the office of the Royal Engineers, now the "Garrison Club," St. Louis Street, where it was found, then again restored and replaced in its niche.

The Bell Telephone Company of Canada lately became owner of "Wolfe's Corner." They repaired the figure, as the wood was decayed and partly destroyed by dry rot, and would have shortly fallen to pieces if exposed to a storm. Thanks to the President of the Bell Company, C. F. Sise, Esq., of Montreal, who had heard of the tradition, it was preserved. In December, 1898, he presented it, through Sir James LeMoine, to the Literary and Historical Society of Quebec for safe keeping, with the sole condition that it should be placed where it might be seen by visitors, but not exposed to the weather. There it has found a proper shelter and a final rest in the library.

However, the disappearance of "General Wolfe" from the old stand he had so long occupied, and from which it was known he could never be removed, preyed upon the minds of many of the citizens of Quebec, and became an abiding regret to the elders when they gazed at the empty niche, and missed the honoured figure of the "General"

they had been accustomed to contemplate from their boyhood. To soothe their feelings, some of them united, and, thanks to the speedy exertions of our esteemed and vigorous octogenarian, John Jones, Esq., they had another figure of "*General Wolfe*" sculptured in wood, well made and duly painted in the proper colours, so as to copy the former one, and had it installed in place of the original, which had been removed, as we have said, to save it from utter destruction.

This *fac-simile* will now stand as a sign to maintain the old tradition of the two understood conditions attached to the original statue—one, that it was *never to be sold*, and the other, its permanency in the same site, according to the true intention of George Hips, and his legal assumption that he could have it surely fixed this way for all time. Thus far his object has been attained, and is likely to be long continued, for "*Wolfe's Corner*" has now become the property of our esteemed citizen, Alderman Bernard Leonard, Esq., and the new effigy may be looked upon as entrusted to safe hands to continue its care and destination.

The name of George Hips, as one of the earliest British settlers in Quebec, and one whose worthy deed has endowed the city with the first memorial to Wolfe in Canada, should never be forgotten by its inhabitants. We hope these few notes will help in that direction, and also to keep up the old tradition derived from him.

Referring again to the above remarks of our London visitor, as to the comparative meagreness of the present column on the Plains, it cannot be denied it is far from being proportionate to the world-wide renown of Wolfe, and the grand results of his victory.

For let us remember that the triumph of the valiant Wolfe on these Plains was the downfall of New France and the securing of the supremacy of England in North America; that hence was born a new and extensive British Colony; that the vanquished French colonists, after a heroic but hopeless defence, became peaceful subjects, and submitted loyally to the English Crown after the Treaty of Paris, according to the oath they had taken; that subsequently they did maintain and prove their true allegiance in resisting not only the allurements of the other revolted British colonists, but also the outside appeals and entreaties of their former countrymen allied to the rebels; that when Quebec was at the time the only stronghold standing against a numerous invading army they defended it, and finally crushed within its walls the assailing foes who had penetrated therein, forcing them to retreat; that again, some time afterwards, a handful of French Canadians repulsed a second invading American army.

This series of momentous events in our historical annals, when recalled, may well produce a strong emotion of patriotic exultation throughout the Dominion of Canada.

And when we trace them back to their beginning in the daring feat and marvellous success of General Wolfe on the Heights of Abraham, and thence down to the wonderful growth and prosperity of this vast Dominion, all Canadians may feel proud of their past, and the four races, now fusing into one united people, can afford, much better than Quebec alone, to erect, with the abounding resources of Canada, monuments in marble and bronze appropriate to revive and perpetuate for future generations the noble deeds of our fathers, and, above all, to mark the spot where fell the immortal Wolfe.

V.—*Radisson in the Northwest, 1661-63.*

By B. SULTE.

(Read June 24, 1904.)

Summary.—In 1661 Radisson ascends the Ottawa (not the St. Lawrence), proceeds to Sault Ste. Marie, thence to the bay of Chagouamigon. He spends the winter (1661-62) at Mille Lacs, amongst the Sioux Beef Nation. During the summer of 1662 he goes to James Bay, and, on his return, passes the winter of 1662-63 at Chagouamigon. In the spring of 1663 he makes known to the Assiniboines that he cannot visit their country, much though he regrets not to see the lake that they say is greater than Lake Superior. He declares to the people of Chagouamigon that he has told the Indians of James Bay of his intention to go to them again by the Atlantic Ocean, as they occupy the country of the beaver, *par excellence*. Radisson departs to descend to Quebec, through Sault Ste. Marie, Lake Nipissing and the River Ottawa.

This is the *Fourth Voyage* of Pierre-Esprit Radisson,* in which I find that the author and his brother-in-law Chouart reached Hudson Bay by land, starting from Lake Superior. Here is his own text:

"We stayed att home att rest that yeare (1660). . . . The spring following we weare in hopes to meet with some company, having ben so fortunate the yeare before. Now, during the winter, whether it was that my brother¹ revealed to his wife what we had seen in our voyage and what we further intended, or how it came to passe, it was known; so much that the ffather Jesuits weare desirous to find out a way how they might gett downe the eastors from the bay of the north by the Saegnes, and so make themselves masters of that trade. They resolved to make a tryall as soone as the ice would permitt them. So to discover our intentions they weare very earnest with me to ingage myselfe in that voyage, to the end that my brother would give over his, which I uterly denied them, knowing that they could never bring it about, becaus I heard the wild men say that although the way be easy, the wildmen² that are feed att their doors would have hindred them, because they make a livelyhood of that trade. . . . Nevertheless the ffathers are gone³ with the Governor's son⁴ of the three rivers and 6 other ffrench and 12 wildmen.

"During that time we made our proposition to the governor of Quebec that we weare willing to venture our lives for the good of the

country, and goe to travell to the remotest countreys with 2 hurons that made their escape from the Iroquoits. . . . My brother and I weare of one minde. . . . The Governor gives him leave, conditionally that he must carry two of his servants ⁵ along with him and give them the moitié of the profit. My brother was vexed att such an unreasonable demand. . . . The Governor was much displeased att this, and commanded us not to go without his leave. . . . The month of August that brings a company of the Sault, who weare come by the river ⁶ of the three rivers with incredible paines, as they said. . . .

"The governor of the place (Three Rivers) defends us to goe. We tould him that the offense was pardonable because it was every one's interest The wild men tould us that they would stay for us two dayes in the Lake St. Peter. . . . we did not lett them stay so long for that very night, my brother having the keys of the Borough as being Captayne of the place, we embarqued ourselves we went,⁷ 3 of us, about midnight. . . . Att 6 in the morning we are arrived to the appointed place, but found nobody. . . . We resolved to goe day and night to the river of the meddows ⁸ to overtake them but 3 leagues beyond that of the fort of Richelieu (Sorel) we saw them coming to us. . . . Being come to the river of the meddows, we did separat ourselvs, 3 into 3 boats It is to be understood that this river is divided much into streams very swift and small before you goe to the river of Canada.⁹ We suffered much for 3 days and 3 nights without rest. . . . Three days after wee found the tracks of seaven boats¹⁰ We tooke no rest till we overtooke them. They cam from Mount royall and weare gone to the great river and gone by the great river,¹¹ so that we weare now 14 boats together, which weare to goe the same way to the height of the upper lake.¹² The day following we weare sett uppon by a company of Iroquoits that fortified themselves in the passage¹³ where they waited of Octauack,¹⁴ for they knewed of their going downe We resolved to give a combat No doubt the ennemy was much surprised to see us so in number. . . . They saw themselves putt to it, and the evident danger that they weare in and resolved to speak of peace During the night the Iroquoits make their escape The following day we embarqued ourselves quietly in the afternoon we met the Iroquoits.¹⁵ They had a bundle of Castor that they left behind without much adoe. Our wild men did the same; they both runne away The Iroquoits threwed themselves into the river to gaine the other side We had killed and taken them all, if 2 boats of theirs had not come to their succour Three of their men neverthe-

lesse weare killed They killed one of our men They retired themselves into the fort, and brought the rest of their men in hopes to save it. In this they weare far mistaken, for we furiously gave an assault, not sparing time to make us bucklers, and made use of nothing else but of castors tied together but to overcome them the sooner, we filled a barill full of gun powder, and having stoped the whole of it well and tied it to the end of a long pole, being att the foot of the fort. Here we lost 3 of our men; our machine did play with an execution, I may well say that the ennemy never had seen the like Now there falls a showre of raine and a terrible storm, that to my thinking there was something extraordinary, that the Devill himselfe made that storm to give those men leave to escape. We found 11 of our ennemy slained and 2 onely of ours, besides seaven weare wounded Many liked the occupation, for they filled their bellies with the flesh of their ennemies. We boiled some of it, and kettles full of the rest The greatest marke of our victory was that we had 10 heads and foure prisoners The next day we perceived seven boats of the Iroquoits they began in all haste to make a fort The night no sooner approached but we embarked ourselves without any noise, and went along:¹⁶ It's trange to me that the ennemy did not encounter us We rowed from friday to tuesday without intermission On the third day the paines and labour we tooke forced us to an intermission, ffor we weare quite spent. After this we went on without any encounter whatsoever, having escaped very narrowly. We passed a sault that falls from a vast height. Some of our wildmen went underneath¹⁷ it, which I have seen, and I myselfe had the curiosity, but that quiver makes a man the surer. The watter runs over the heads with such impetuosity and violence that it's incredible. We went under this torrent a quarter of a mile, that falls from the toppe above fourty foot downwards.

"Having come to the lake of the Castors¹⁸ some went a hunting, some a fishing. This done, we went downe the river of the sorcerers,¹⁹ which brought us to the first great lake. What joy had we to see ourselves out of that river so dangerous, after we wrought two and twenty dayes²⁰ and as many nights, having not slept one hour on land all the while Our equipage and we weare ready to wander uppon that sweet sea; but most of that coast²¹ is void of wild beasts, so there was great famine amongst us for want Afterwards we entered into a straight²² which had 10 leagues in length, full of islands, where we wanted not fish. We came after to a rapid that makes the separation of the lake of the hurrons, that we calle

Superior, or upper, for that the wildmen hold it to be longer and broader, besides a great many islands, which makes appeare in a bigger extent. This rapid was formerly the dwelling²³ of those with whome wee weare, and consequently we must not aske them if they knew where they have layed. Wee made cottages att out advantages, and found the truth of what those men had often said, that if once we could come to that place, we should make good cheare of a fish that they call Assickmack, which signifieth a white fish. The beare, the castors and the oriniack shewed themselves often, but to their cost; indeed it was to us like a terrestriall paradise But the season was far spent, and use diligence and leave that place so wished, while wee shall bewaile, to the coursed Iroquoits.²⁴ What hath that poore nation done to thee, and being so far from thy country? Yett if they had the same liberty that in former dayes they have had, we poore ffrench should not goe further with out heads except we had a strong army. Those great lakes had not so soone comed to our knowledge if it had not been for those brutish people; two men²⁵ had not found out the truth of these seas so cheape; the interest and the glorie could not doe what terror doth att the end The weather was agreable when we began to navigat upon that great extent of watter, finding it so calme and the aire so cleare. We thwarted in a pretty place, came to an isle most delightfull for the diversity of its fruits. We called it the isle of the foure beggars We went from thence to gaine the firme lande, which was 6 leagues from us There we found a small river. It was so curious that I inquired my dearest friends the name of this stream. They named me it *panabickkomesibs*, which signifieth a small river of copper. I asked him the reason. He told me, "Come, and I shall shew thee the reason why." I was in a place which was not 200 paces in the wood, where many pieces of copper wears uncovered. Further he told me that the mountains I saw was of nothing else. Seeing it so faire and pure, I had a mind to take a piece of it, but they hindered me, telling my brother there was more where we weare to goe. In this great Lake of myne owne eyes have 'seene which are admirable, and came maintaine of a hundred pounds teem will not be decayed.

"From this place we went along the coasts, which are most delightfull and wondrous, for it's nature that made it so pleasant to the eye, the sperit and the belly. As we went along we saw bankes of sand so high that one of our wildmen went upp for curiositie, being there, did shew no more than a crow There comes many sorte of birds that makes their nest here, the goilants, which is a white sea-bird of the bignesse of pigeon, which makes me

believe what the wildmen told me concerning the sea to be neare directly to the point We came to a remarquable place. . . . It's like a great Portall,²⁶ by reason of the beating of the waves. The lower part of that oppening is as bigg as a tower, and grows bigger in the going up. There is, I believe, 6 acres of land. Above it a shipp of 500 tuns could passe by, soe bigg is the arch. I gave it the name of the portall of St. Peter, because my name is so called, and that I was the first²⁷ Christian that ever saw it. There is in that place caves very deepe, caused by the same violence some dayes afterwards we arrived to a very beautifull point of sand where there are 3 beautifull islands²⁸ that we called of the Trinity, there be 3 in triangle. From this place we discovered a bay²⁹ very deepe, where a river empties itselfe with a noise for the quantitie and dept of the watter. We must stay there 3 dayes to waite for faire weather to make the Trainage,³⁰ which was about 6 leagues wide. Soe done, we came to the mouth of a small river, where we killed some Oriniacks Commers and goers by making that passage shortens their passage by 8 dayes by touring about that point that goes very farr in that great lake In the end of that point, that goeth very farre, there is an isle, as I was told, all of copper.³¹ This I have not seen. They say that from the isle of copper, which is a league in the lake when they are minded to thwart it in a faire and calme weather, beginning from sun rising to sun sett, they come to a great island,³² from whence they come the next morning to firme lande att the other side,³³ so by reason of 20 leagues a day that lake should be broad of 6 scores and 10 leagues. The wildmen doe not much lesse when the weather is faire. Five dayes after we came to a place where there was a company of Christinos that weare in their cottages We went on and came to a hollow river which was a quarter of a mile in bredth.³⁴ Many of our wildmen went to win the shortest way to their nation seaven boats stayed of the nation of the Sault. We went on half a day before we could come to the landing place, and weare forced to make another carriage a point³⁵ of 2 leagues long and some 60 paces broad. As we came to the other sid we weare in a bay³⁶ of 10 leagues about, if we had gone in. By goeing about that same point we passed a straight, for that point was very high the other side, which is a cape very much elevated like pyramides. That point should be very fitt to build and advantageous for the building of a fort, as we did³⁷ the spring following The wildmen gave thanks to that which they worship, we to God of Gods, to see ourselves in a place where we must leave our navigation The men told us that wee had 5 great

dayes, journeys before we should arrive where their wives weare . . .
 My brother and I we consulted what was best to doe, and declared our
 will to them, which was thus: 'Brethren, we resolve to stay here,
 being not accustomed to make any carriage on our backs as yee are
 wont. Goe yee and look for your wives. We will build us a fort here.
 And seeing that you are not able to carry all your merchandizes att
 once, we will keepe them for you, and will stay for you 14 dayes . . .'
 The next day they went their way We went about to make
 a fort of stakes.³⁸ We made an ende of that fort in 2 dayes' time . . .
 The 12th day we perceived afarr off some 50 yong men coming towards
 us, with some of our former companions They offered to
 carry our baggage, being come a purpose; but we had not so much
 marchandizes as when they went from us, because we hid some of
 them, that they might not have suspicion of us. We told them that
 for feare of the dayly multitude of people that came to see us, for to
 have our goods would kill us There came above foure hun-
 dred persons to see us goe away from that place We marched
 foure dayes³⁹ through the woods Att last we came within
 a league of the Cabbans neare a little lake some 8 leagues
 in circuit We came to a cottage of an ancient witty man
 of a nation called Malhonmines, that is, the nation of Oats,
 graine that is much in that countrey The winter comes
 on we must retire from the place to seeke our living in
 the woods We appointed a rendez-vous after two months and
 a half We killed several beasts as Oriniacks, staggs, etc.,
 in a word we lead a good life We are come to the small
 lake, the place of rendez-vous We stayed 14 dayes in this
 place most miserable To augmente our misery, we received
 news of the Octauacks who weare about a hundred and fifty, with their
 families. They had a quarell with the hurrons in the Isle where we
 had come from some years ago before in the lake of the stairing hairs,
 and came purposely to make warres against them the next summer
 Having no-huntsmen; they are reduced to famine
 They are the coursedest unblest, the unfamous and cowardiest people
 that I have seene amongst fower score nations that I have frequented
 The 2 first weeke we did eate our doggs The
 wood was our food the rest of the sorrowfull time. Finally we became
 the very image of death Here are above 500 dead, men,
 women and children There came 2 men from a strange
 countrey Those men weare Nadoucseronons. They weare
 much respected that nobody durst not offend them, being that we weare
 uppon their land⁴⁰ with their leave some 2 moons after

there came 8 ambassadors from the nation of Nadoueseronmons, that we will call now the Nation of the beefe They weeped uppon our heads untill we weare wetted by their tears We understood not a word of their language, being quite contrary to those that we weare with There was nothing but feasting for 8 dayes In 3 dayes' time there arrived eighteen severall nations As we became to the number of 500, we held a councell They made a large fort Soone 30 yong men of the nation of the beefe arrived, having nothing but bows and arrows, with very short garments, to be the nimbler in chasing the stagges The Elders of their village weare to come the morrow to renew the friendship and to make it with the ffrench The day following they arrived with an incredible pomp. This made me thinke of the Intrace that the Polanders did in Paris, saving that they had not so many Jewells, but instead of them, they had so many feathers We are called to the counsell Our Interpreter tell them that the Christinos weare our brethren . . . that if they would continue the warres (against the Christinos) that was not the meanes to see us againe in their Countrey A company of about 50 weare dispatched to warne the Christinos of what we had done. I went myselfe, where ⁴¹ we arrived the 3rd day. I was received with great demonstration of ffriendshippe. All that day we feasted, danced and sing There weare about 600 men The snow blinded me The meane while that we are there, arrived above a thousand that had not ben there but for those two redoubted nations that weare to see them doe what they never before had, a difference which was executed with a great deale of mirth There weare playes, mirths, and bataills for sport each plaid his part. In the publick place the women danced with melody This feast ended, every one retourns to his countrey well satisfied. To be as good as our words, we came to the nation of the beefe, which was seaven small Journeys ⁴² from that place. We promised in like maner to the Christinos the next spring we should come to their side of the upper lake ⁴³ and there they should meete us, to come into their countrey. We being arrived amongst that nation of the beefe, we wondred to finde ourselves in a towne ⁴⁴ where weare great cabbans mostly covered with skins and other close matts. They tould us they weare 7,000 men. ⁴⁵ This we believed. Those have as many wives as they can keepe. If any one did trespasse upon the other, his nose was cutt off, and other the crowne of his head. The maidens have all maner of freedom, but are forced to mary when they come to the age. The more they beare children the more they are

respected. I have seen a man having 14 wives. There they have no wood, and make provision of mosse for their firing. This their place is environed with pearches which are a good distance one from another, that they gett in the valleys where the Buffe used to repaire, uppon which they do live. They sow corne, but their harvest is small. The soyle is good, but the cold hinders it, and the graine very small. In their countrey are mines of copper, of pewter and of ledd.⁴⁶ There are mountains covered with a kind of Stone that is transparent and tender, and like that of Venice. The people stay not there all the yeare; they retire in winter towards the woods of the north, where they kill a quantity of Castors, and I say that there are not so good in the whole world, but not in such a store as the Christinos, but far better.

"We stayed there 6 weeks, and came back with a company of people of the nation of the Sault, that came along with us loaden with booty. We weare 12 dayes before we could overtake our company that went to the lake. The spring approaches, which is the fittest time to kill the Oriniack. A wildman and I with my brother killed that time above 600, besides other wild beasts. We came to the lake side with much paines, ffor we sent our wildmen before, and we two weare forced to make cariages 5 dayes through the woods. After we mett with a company that did us a great deale of service, ffor they carryed what we had, and arrived att the appointed place⁴⁷ before 3 dayes ended. Here we made a fort.⁴⁸ Att our arrivall we found att least 20 cottages full.

"One very faire evening we went to finde what we hide before, which we finde in a good condition. We went about to execute our resolution, fforseeing that we must staye that yeare⁴⁹ there, ffor which we weare not very sorry, being resolved to know what we heard before. We waited untill the Ice should vanish, but received news that the Octaouacks built a fort on the point that formes that Bay, which resembles a small lake We resolved to cover our bussinesse better, and close our designe as if we weare going a hunting We thwarted a place of 15 leagues. We arrived on the other side⁵⁰ att night We are received with much Joy by those poore Christinos We went away with all haste possible to arrive the sooner att the great river.⁵¹ We came to the seaside⁵² where we finde and old howse all demolished and battered with boulettts They tell us particularities of the Europeans We went from Isle to Isle all that summer We weare well beloved, and weare overjoyed that we promised them to come⁵³ with such shippes as we invented. This place hath a great store of cows. The wildmen kill them not except for necessary use. We went further in the bay

to see the place that they weare to passe that summer. The river comes⁵⁴ from the lake and empties itselfe in the river of Sagnes, called Tadoussack, which is a hundred leagues in the grand rive of Canada, as where we weare in the Bay of the north.⁵⁵ We left in this place our marks and rendez-vous They made us a mapp of what we could not see We passed that summer quietly, coasting the seaside, and as the cold began, we prevented the Ice This is a wandring nation,⁵⁶ and containeth a vaste countrey. In winter they live in the land for the hunting sake and in summer by the watter for fishing.⁵⁷ They never are many together, ffor feare of wronging one another. They are of a good nature There is a nation called among themselves neuter. They speake the beefe and Christinos speech, being friends to both We went up on another river⁵⁸ to the upper lake. The nation of the beefe sent us guifts, and we to them by ambassadors.⁵⁹ In the middle of winter⁶⁰ we joyned with a Company of the fort,⁶¹ who gladly received us. They weare resolved to goe to the ffrench the next spring, because they weare quite out of stocke They blamed us, saying we should not trust any that we did not know.⁶² They upon this asked if we are where the trumpetts are blowne. We said yea, and tould that they weare a nation not to be trusted, and if we came to that sea we should warre against them, because they weare bad nation, and did their indeavour to tak us to make us their slaves.

"In the beginning of the Spring, there came a company of men that came to see us from the elders⁶³ and brought us furs to intice us to see them again By our ambassadors I cam to know an other lake⁶⁴ which is northerly of their countrey. They say that it's bigger than all the rest. The upper end is always frozen

"All the circumjacent neighbours do incourage us, saying that they would venture their lives with us, for which we weare much overjoyed to see them so freely disposed to goe along with us The boats ready, we embarque ourselves. We weare 700. There was not seene such a company to goe downe to the ffrench. There weare above 400 Christinos boats that brought us their castors, in hope that the people should give some marchandises for them The company that we had filled about 360 boats. There weare boats that caryed seven men, and the least two In two days we arrived att the River of the sturgeon There we weare to make our provisions to passe the lake some 14 dayes We goe from thence, but before we come to the Longpoint wherof we spoake before, the wildmen called it *okinotoname*, we perceive smoake. We goe to

discover what it was, and by ill looke we found it was a Iroquoits boat of seaven men, who doubtlesse stayed that winter in the lake of the hurrons, and came there to discover somewhat. I cannot say that they weare the first that came there.⁶⁵ God graunt that they may be the last. As they saw us, away they, as swift as their heels could drive. They left their boat and all The councell was called, where it was decreed to go backe and shooke off to goe downe to the ffrench till the next year. This vexed us sore to see such a fleete and such an opportunity come to nothing, foreseeing that such an other may be not in tenne years We went back to the river of the sturgeons We dayly heare some newe reporte. All Avery where ennemy by fancy Twelve dayes are passed, in which time we gained some hopes of faire words. We called a councell The next day we embarqued, saving the Christinos, that weare afraid of a fight Being come nigh the Sault, we found a place where 2 of these men sweated We now are comed to the cariages and swift streames to gett the lake of the Castors We goe downe all the great river without any encounter, till we came to the long Sault, where my brother some years before made a shipwracke. Being in that place we had worke enough. The first thing wee saw was severall boats that the Ennemy had left att the riverside. This putt great feare in the hearts of our people. Nor they nor we could tell what to doe, and seeing no body appeared we sent to discover what they weare. The discovers calls us, and bids us come, that those who weare there could doe us no harme. You must know that 17 ffrench made a plott⁶⁶ Tis was a terrible spectacle to us, for wee came there 8 dayes after that defeat, which saved us without a doubt We went downe the river We stayed 3 dayes att mont-Royall, and then we went downe to the three Rivers. The wildmen did aske our advice whether it was best for them to goe down further. We told them no, because of the dangers that they may meet with at their return, for the Iroquoits could have notice of their comeing down, and so come and lay in ambush for them, and it was in the latter season, being about the end of August. Well, as soon as their bussinesse was done, they went back again very well satisfied. . . . The Governor⁶⁷ seeing us come back with a considerable summe for our owne particular, and seeing that his time was expired, and that he was to goe away, made use of that excuse to doe us wrong and to enrich himselfe with the goods that wee had so dearly bought and by our meanes wee made the countrey to subsist He made also my brother prisoner for not having observed his orders, and to be gone without his leave He finds foure thousand

pounds⁶⁸ to make a Fort at the three Rivers and moreover 6,000 pounds for the countrey and more, made us pay a custome which was the 4th part, which came to 14,000 pounds, so that wee had left but 46,000 pounds, and took away £24,000⁶⁹ We had brought by that voyage, as the Factors of the said country said, between 40 and 50,000 pistolls⁷⁰ Seeing ourselves so wronged, my brother did resolve to goe and demand Justice in France. It had been better for him to have been contented with his losses without going and spend the rest in halfe a year's time in France, having £10,000 that he left with his wife, that was as good a Housewife as he. There he is in France; he is paid with fair words and with promise to make him goe back from whence he came; but he seeing no assurance of it, did engage himselfe with a merchant of Rochell."

Whatever may be said of the whereabouts of Chouart and Radisson during the summer of 1662, whether they went to James Bay or to Lake Winnipeg, is open to discussion, although I believe they visited James Bay.

We have also to grapple with the puzzle contained in the few lines by Father Jérôme Lalemant of the 3rd May, 1662 (note 51), showing what looks like a positive *alibi*. This will have to be explained, like so many other historical contradictions caused by interpolation or accidental misplacement of an entry in a journal similar to that of the Jesuit Fathers. We must leave it for the present to the consideration of students of the history of Canada.

FOOT-NOTES

* Madelaine Hainault, married : first, Sébastien Hayet, of St. Malo ; their daughter, Marguerite, married Chouart ; second, Pierre-Esprit Radisson, of Paris, by whom she had : Pierre-Esprit, Françoise, married to Volant, and Elizabeth, married to Jutras.

¹ On the 7th June, 1661, at Three Rivers, Father Claude Jean Allouez, christened Antoinette, daughter of "Medard Chouart and Marguerite Ayet." It may be noted here that Marguerite is always designated under the name of Ayet or Hayet in the records of the time, whilst Françoise and Elizabeth are constantly called Radisson. Their mother had married twice. Marguerite was the elder of the two other sisters and also of Pierre-Esprit Radisson.

² The Outaouas, for five or six years were in the habit of buying the furs from the Christinos at Lake Superior and selling them afterwards to the French of Three Rivers and Quebec.

³ An expedition composed of Fathers Dablon and Dreuillette, with eighty Indian canoes left Tadoussac on the 1st and 2nd of June, 1661 "for the Kiristinos," says the *Journal des Jésuites*. They were accompanied by Michel Le Neuf de la Vallière, Denis Guyon, Guillaume Couture, François Pelletier, Couillard Després, with instructions from d'Argenson "to reach the North Sea." A few days later the Iroquois killed several persons at Tadoussac, and one of their bands roving through the St. Maurice and the Upper Saguenay, struck a camp of Attikamegues and Frenchmen at Lake Necouba destroying them to the last man. The Dablon party was then near Lake Necouba, but they dared not push further, and returned to Tadoussac.

⁴ Jacques le Neuf de la Poterie was Governor of Three Rivers. His son, Michel, born at that place, October 31st, 1640, had just come back from France and he already bore the surname of la Vallière, by which historians know him as Captain of Frontenac's guard and Governor of Acadia.

⁵ The law was that twenty-five percent of the furs brought to the market belonged to the administration of the colony. Besides this duty, the Governor wanted to take half of the profits of the trip for the two men appointed by him. This exaction did not meet with the approval of Chouart and Radisson.

⁶ Now River St. Maurice, a name adopted sometime about the year 1720.

⁷ François Larivière was the third one. He lost himself in the woods at Lake Two Mountains and was found starving by some Frenchmen hunting in the neighborhood. The Governor of Three Rivers imprisoned him for desertion, but the people of the place managed to obtain his discharge.

⁸ Rivière des Prairies. It is the arm of the Ottawa which passes between Montreal and Jesus Island. In those days the whole of the River Ottawa was called des Prairies.

⁹ The two branches of the Ottawa encircling the Island of Jesus afford two entrances into the Ottawa which was then considered as the continuation of the St. Lawrence or River of Canada.

¹⁰ Probably in Lake Two Mountains.

¹¹ Another name of the Ottawa.

¹² Lake Superior.

¹³ Foot of Long Sault where Dollard and his companions had perished the year before.

¹⁴ The seven boats just mentioned.

¹⁵ In one of the various portages of Long Sault, possibly at Chute à Blondeau.

¹⁶ Near Grenville it seems.

¹⁷ Rideau Falls, within the limits of the City of Ottawa. Champlain (1613) speaks of these "curtains" pretty much in the same terms as Radisson.

¹⁸ Nipissing.

¹⁹ French River.

²⁰ This was about September 1st.

²¹ North coast of Georgian Bay.

²² Sault Ste. Marie River.

²³ After their dispersion from Manitoulin Island in 1650, a large band of Outaouas had resided at Kionconan, south of Lake Superior.

²⁴ In 1662 the Iroquois appeared in arms both at Green Bay and Sault Ste. Marie.

²⁵ Can this be an allusion to the two men sent towards Green Bay by Governor de Lauzon in 1654?

²⁶ The Portal crumbled down five or six years ago.

²⁷ We must take note that in the autumn of 1659 Radisson and Chouart had passed by the same place, without mentioning the Great Portal, but they may have known of its existence. Other *coureurs de bois*, such as Trottier and his men, were there also in 1660. Nicolas Perrot keeps silent about this, and, indeed, never takes any interest in the natural beauties of the country he travels through. We must not forget to point out that Perrot, Radisson, LaSalle, Hennepin and Duluth ignore systematically the names and the doings of each other and also leave in the dark the bushrangers who preceded them in the West.

²⁸ Called Huron Island, at the entrance of Keweenaw Bay.

²⁹ East side of the Grand Point of Keweenaw. This point projects towards the north to a full third of the breadth of Lake Superior.

³⁰ Portage across Keweenaw Point. The island opposite is called Portage Island.

³¹ Pierre Boucher, writing from Three Rivers, in the autumn of 1663, after the return of Radisson, says:—

"In Lake Superior there is a large island of about fifty leagues in circumference, on which there is a very rich bed of copper ore. Large lumps of pure copper are to be found there in several places. There are other places in that neighbourhood where there are similar beds, as I have learned from four or five Frenchmen, lately returned from there, who had gone thither in company with a Jesuit Father (René Menard left Three Rivers in August, 1660), sent there on a mission, who has since died. (South of Lake Superior, August, 1661). They passed three years there before they could find an opportunity to get away; they told me that they had seen a nugget of pure copper, on the side of the hill, that would weigh more than eight hundred pounds, according to their estimate. They say that the Indians when they pass that way make fires on the top of it and then hew pieces out of it with their axes, and that one of themselves broke his axe in the act of trying to do the same. It would not be difficult to get

there if we were masters of the Iroquois and could go through their great lake."

³² Called by the French Ile Royale.

³³ Pigeon Bay on the northwest coast of Lake Superior.

³⁴ Montreal River now. It is only thirty miles long. From there a trail leads to the sources of the Chippewa. Montreal River springs at eight hundred feet above Lake Superior and forms the limit between the States of Wisconsin and Michigan, then falls into Chegowanegan Bay, 112 miles from Fond-du-Lac.

³⁵ Oak Point in the County of Ashland.

³⁶ Chagouamigon Bay.

³⁷ So they did, as we shall see afterwards. It was on Oak Point, looking on Chagouamigon Bay.

³⁸ Near the towns of Ashland and Washburn, in the State of Wisconsin.

³⁹ To Namakagon Lake. Somewhere in the vicinity of Lake Courte Oreille.

⁴⁰ From the time of the arrival of the French and until 1700, if not later, the territory which the Sioux considered as their own property embraced not only the sources of the St. Lawrence and the Mississippi, but all the Wisconsin to Escanaba on the east, and Madison on the south.

⁴¹ Chouart and Radisson spent the winter of 1661-2 in the neighbourhood of the Chippewa River and Lake Courte Oreille. In the early spring they went to meet the Christinos, probably near the City of Duluth or some other spot at Fond-du-Lac.

⁴² From the present City of Duluth to Lake Mille Lacs.

⁴³ The whole country north of Lake Superior was the home of the Christinos.

⁴⁴ Kathio, southwest of Lake Mille Lacs. Duluth, who saw the people of this place in 1679, calls them Isanti, which means those who first obtained iron implements or tools from the French. Hennepin was a prisoner there in 1680.

⁴⁵ This was at the end of the winter. During the summer the town became nearly empty because the hunters went to the south.

⁴⁶ Pierre Boucher adds in the report above quoted:—

"They informed me also that beautiful blue stones, believed to be turquoises, are also to be found there. Green stones like emeralds are found there also. There are diamonds there also, but I do not know if they are pure ones or not. They were not able to go to the place where these stones are because the Indians were not willing to guide them to it without being paid for doing so, seeing that it was pretty far off, and they being poor, did not dare to risk the expense, not being sufficiently well informed on the subject to be able to judge whether the stones were valuable or not. Red stones of two shades of colour are found there also, some being scarlet and others of the colour of the blood of an ox; the Indians make calumets or pipes of them, for smoking tobacco, which they think a great deal of."

⁴⁷ Ashland.

⁴⁸ On Oak Point. Their fort was on that site, as already stated. The *courcurs de bois* adopted the rather pompous expression of "fort" when

referring to any of their temporary camps or places of rest. There was nothing military in it.

⁴⁹ Here they found themselves at the beginning of May, 1662, in the Bay of Chagouamigon, quite prepared to explore Hudson Bay or James Bay and to return to Canada the next year, which plan they carried out exactly.

⁵⁰ Pigeon River, also called Grand Portage and Rivière des Groseilliers. It is the limit between Canada and the United States.

⁵¹ Moose River? It was in the early part of June, 1662. Here the reader will meet with an unexpected document which must not be omitted by any means. Father Jérôme Lalement writes the following entry in the *Journal des Jésuites*:

"I left Quebec on May 3rd, 1662, for Three Rivers. I came across des Groseilliers, who was going to the North Sea. He passed during the night before, Quebec, with ten men, and, having arrived at Cap Tourmente, he wrote to the Governor."

If the date of this note is correct, the voyage of Radisson may be open to doubt.

⁵² Father Louis Hennepin, in his edition of 1698, page 290, states that:—

"The Great Bay of the North was discovered by Mr. Desgroseliers Rochechouart (sic) with whom I often travelled in canoe when I was in Canada."

⁵³ During his exploration of Lake Pepin and Upper Mississippi, part of the summer of 1659, also during his residence amongst the Sioux, in the winter of 1659-60, Radisson was looking solely for the grounds where the best beaver skins could be obtained. (Royal Society, 1903, Section 1., pp. 32, 35, 37, 41). This time the two men had found what they wanted, and soon decided to abandon the route of Lake Superior and go to James Bay in the future, either by ascending the Saguenay or sailing to Hudson Bay from the Atlantic Ocean. This is what they told the Indians of James Bay and Chagouamigon in plain terms.

⁵⁴ River Assuapmouchan? This remark is from Dr. N. E. Dionne (Royal Society, 1893, Section I, p. 132). Radisson was not far from the source of that river, which is a prolongation of the Saguenay.

⁵⁵ Radisson and Chouart already knew that the Indians who used to visit annually the north shore of Lake Superior, visited just as frequently the Great Bay of the North. Noël Jérémie, alias Lamontagne, says positively, that Chouart "being in the country of the Outaouas (Lake Superior) advanced so far from there that he acquired a knowledge of Hudson Bay," which we may take also for James Bay.

⁵⁶ They were called Gens des Terres (Island people) and Christinos or Cristinos and Killistons.

"On the 5th of July, 1664," says the *Journal des Jésuites*, "we got news that 220 Sauvages des terres had arrived at Montreal with plenty of rich skins; amongst them were eighty Kiristinons. They asked for a missionary."

⁵⁷ At Moose Factory the temperature is such that celery, carrots, pumpkins, peas, cauliflowers, lettuce, etc., are growing easily and well.

⁵⁸ I assume that they had left Lake Superior at Michipicoten (the Big Mushroom) to follow Moose River, which allowed them to reach James Bay. Coming back they ascended Albany River, passed to the Kenogami, Lake Long, Black River, then to Lake Superior or Upper Lake.

⁵⁹ It is evident that they did not pay a second visit to the Beef Sioux in their country. Radisson mentions the Assiniboines, but does not pretend to have seen them; consequently they did not go up Pigeon River nor the Kaministiquia (Rivière Errante).

⁶⁰ Winter of 1662-3, after returning from James Bay.

⁶¹ Ashland, Oak Point.

⁶² As usual the Indians of Chagouamigon wished to keep the trade themselves. They were afraid that the Christinos would become direct customers of the French. It is to be observed that Chouart and Radisson were sharp and positive in their answers to them, and this is because they knew that these people were apt to become insolent if treated mildly. Such was also the doctrine of Nicholas Perrot.

⁶³ The Elders of the Beef Sioux.

⁶⁴ Winnipeg?

⁶⁵ The year before some 100 Iroquois had been destroyed by the Sauteurs on Lake Superior, the southeast shore.

⁶⁶ This passage is not in the proper place. (See Royal Society, 1903, Section 1, p. 39-40).

⁶⁷ Avaugour, who had succeeded Argenson, was replaced by Mésy, 15th September, 1663. Pierre Boucher was Governor of Three Rivers.

⁶⁸ Most likely "quatre mille livres," four thousand francs, equivalent to £160.

⁶⁹ Therefore the furs of our own two men amounted to 70,000 francs, on which sum 24,000 francs went to the administration of the colony, according to law. Money in those days represented five times more value than at present. Convert the franc of twenty sous each into one dollar to have a fair calculation.

⁷⁰ One pistol was worth ten francs then.

VI.—*Pythagoras and his Philosophy.*

By ARTHUR HARVEY.

(Read June 24, 1904.)

The object of this paper is to trace Pythagorean philosophy to its source; a task which the ancients imperfectly performed and for which new *data* have but recently been made available. The difficulty which confronts the enquirer is that the master committed none of his views to writing, and, though the same thing may be said of Socrates, the latter did not, like the former, forbid his friends and followers to do so. The place due to Socrates is therefore fixed, his tenets are fairly understood, but Pythagoras has been a mystery, and it would be rash to try to clear it up were it not for the flood of light brought to us by the comparative methods now used. Recently enlarged acquaintance with Indian, Assyrian and Egyptian languages and monuments has immensely widened the field of comparative philology, comparative religion, and comparative philosophy. The attempt to use the latter for the solution of the Pythagorean enigma will lead us far in search of facts, and the investigation must cover an extended period and space, but some definite conclusion is necessary if we are to fix the place in the House of Fame to which Pythagoras is entitled. On the one hand so well-read a scholar as the Countess Martinengo Cesaresco declares that "Pythagoras was the Newton, the Galileo, perhaps the Edison and Marconi of his epoch." On the other we may note that Lucretius dismisses him with but a line, and Prof. Watson, of this Society, in a paper lately delivered to the Royal Astronomical Society of Canada, at Toronto, referred to him with equal brevity.

Eratosthenes, quoted by Diogenes Laertius (Lib. VIII, 47) says that in the forty-eighth Olympiad Pythagoras, having entered in the boys' class at boxing matches, was objected to as being too strong for the other lads, so he was transferred to the grown men and beat them all. It being contrary to rule to enter the adult class voluntarily under twenty, we may suppose him to have been then nineteen, which would place the date of his birth at 608 B.C. He was the son of Mnesarchus, an engraver of gems for rings, of the island of Samos. The time and place are both of importance to our story. Egypt, which, under some of its Pharaohs, had carried its victorious arms far into Syria, was

facing a consolidated Assyrian Empire, and a life and death struggle between the two was imminent. Spheres of influence were being contended for and alliances sought by both, especially with the Greek peoples and potentates, whose military and naval power, particularly the latter, was considerable. Cyrus and Cambyses in Persia and Amasis in Egypt were the monarchs of the respective nations at the Pythagorean period, and Polycrates was the ruler of Samos, between whom and Amasis there was a close and apparently a personal friendship. A map of the Levant, extended to include Italy, will show the important position of this island at a time when the mariner's compass was not in use and vessels crept along the shores, guided by such sailing directions as we find in the *Odyssey*.

Samos is one of the loveliest islands of the beautiful Ægean, only a mile from the Asiatic coast, some forty-five miles south from Smyrna. It is thirty miles in length by eight or ten in breadth, and as a mountain of nearly 5,000 feet slopes upwards from a fertile plain, it is well watered and highly productive. Its exports now reach a million dollars of annual value.¹

This was not, let me incidentally mention, the Samos mentioned in the *Iliad* (Bk. II, v. 634) as sending to the Trojan war part of the small contingent of a dozen ships commanded by Ulysses. We hear of it, however, in historic times as one of the most powerful members of the Ionic Confederacy, and we know that its people were among the first to turn their attention to naval affairs. Colæus, the Samian, was the first Greek to sail out into the Atlantic, and the islanders founded numerous colonies in the comparatively barbarian lands of Thrace, Italy and Sicily. The little state reached its highest development under Polycrates. One may wonder if Mnesarchus engraved the gem for Polycrates about which Herodotus tells his well-known story. The tyrant (or perpetual president) had been so wonderfully fortunate that, as he told Amasis, he distrusted his luck, and was advised to throw his most highly prized possession into the sea. He cast his ring into the waves, which was returned to him in a fish

¹ Mr. Victor Bérard (*Revue des Religions*, vol. 39) gives an interesting account of the names of the Ægean Islands. Samos, once called Same, is thought to be named from the Phœnician Sama, a height. One of its early names was *Μελάμβροτος*, darkly shaded; another was *Δρίονσσα*, from its oak forests. By the Carians it was called *Παρθένα*, the Virgin Isle, and still another Phœnician name was *Ἰμόραιοζ*. Still another appellation was *Ἀνθεμόνις*, in allusion to the flowery plain which faced the narrow strait between it and Asia Minor, which was the usual channel through which all vessels plying between Egypt and the Hellespont had to pass. Its position for strategic purposes was therefore unrivalled, and pirates found the situation suitable whenever the naval policing of the Levant was lax.

served up at a banquet by his cook.¹ This we may or may not credit, but we can readily believe and see the reason why the fleets of Amasis often visited Samos on their way to the various Ægean isles and to the settlements on the Asiatic coasts of Italy.

Such was the island where this vigorous young man, Pythagoras, first saw the light. He is said to have been studious from an early age, to have received instruction from several teachers, and among them is mentioned Pherecydes, a Syrian. Great as his opportunities were at home, he left his native isle while yet a youth, to add to local knowledge that which other peoples possessed. As men now go up to Oxford, or to some German university, so then they went to Egypt, the nearest great repository of learning. Solon, of Athens, poet and lawyer, had just been there, at Heliopolis, as had Thales, the founder of the Ionic Confederation and the first of the Greeks who speculated on cosmogony. Plato was afterwards to tread in their footsteps. But Pythagoras is said to have had unusual advantages; he was favoured with a letter of introduction from Polycrates to Amasis, sojourned in Egypt for some years, and became proficient in the language of the country, where he learned their secret views about religion. (*Τὰ περὶ θεῶν*.) On his way to Egypt he had tarried a while in Crete, and, with Epimenides, had visited the Idæan cave. It is only yesterday that archæological discoveries in Crete have made us aware how important a centre of art and industry the island had been before his time and perhaps still was. From Egypt, he went to Babylon. Cicero (*de fin. lib. v*, 29) exclaims, "Why did Pythagoras survey Egypt and visit the Persian Magi (but in pursuit of knowledge): why did he cross afoot so many foreign lands?" How he was induced to go there is not difficult to understand, though the accounts seem tinged with romance. Apuleius Floridus says: "Some recount that when he was being carried about Egypt, among the captives of King Cambyses" (who had just swept down through that country with his victorious army and added it to his dominions), "he met learned Persian magi, and especially Zoroaster, the expounder of divine mysteries. But a more trustworthy report is as follows: Having of his own desire sought for Egyptian learning and acquired from the priests of that country a knowledge of their religion, of the wonderful powers of numbers (which are hard to believe) and of the best theorems in Geometry, he was not yet satisfied, but of his own free will visited the Chaldeans and even

¹ Somewhat analogous is a statement by Mr. John Maughan, of Toronto, that when cleaning for his shooting party's lunch a duck killed on Shoal Lake, west of Rat Portage, the cook found a nugget of gold in the bird's crop.

"the Brahmins, among whom he particularly attached himself to the sect of the Gymnosophists. Now, the Chaldæans have a knowledge of the constellations, of the regular revolutions (*statos ambitus*) of the planets, and can tell the various influences of the heavenly bodies on the birth-fates of men. They have also collected, at great expense, from earth, air and sea, medicines for curing people's diseases. But the Brahmins contributed much to his views of philosophy, such as what could be taught about the mind and the training of the body, how many functions the mind has, how many changes we undergo in life (*quot artes animi, quot vices vitæ*) and what are the rewards and punishments dealt out to each, according to his merits, by the Gods of the nether-world." Apuleius, himself a wealthy man, an extensive traveller and a student of philosophy, was as likely as any one living in his century, the second after Christ, to be well informed. Porphyry, a century later, says that Pythagoras visited the Arabians and Hebrews and the Chaldæans. Clement of Alexandria, who came between the two, tells us that he embraced many of the doctrines of the Indians, thinks (erroneously, as I hold) his abstinence from meat was connected with the Jewish system of avoiding blood, and adds, on the authority of Antiphon, that it was difficult to obtain access to the Egyptian priests, who kept their knowledge secret from other people. It is needless to repeat what has been said by others, confirmatory of these distant travels, by Lucian, Pliny (lib. 25, cap. 12), Strabo (lib. 14), Jamblichus (*de vitâ Pythagoræ*) ; we will revert to the phrase of Isocrates, early in the fourth century before Christ, who says that having returned from Egypt, where he had studied, he was the first to instruct the Greeks in foreign philosophy (*Τῶν τε ἁλλήνων φιλοσοφίαν*) It was the consensus of antiquity that Pythagoras had traversed Asia and studied among Magi and Brahmins, as well as among the Egyptian priests.

Porphyry tells us that when he returned to Samos, which he would naturally revisit first on again reaching lands where Greek was spoken, and found that the islanders were bound under the tyranny of Polycrates, he thought it unworthy of a philosopher to live there, and resolved to emigrate to Italy. In this he follows Diogenes Laertius (second century A.D.) who writes that "finding on his return to Samos that the State was ruled by Polycrates, he went to Crotona, in Italy." There is some confusion here; it seems unlikely that he would forget the relations to a distinguished ruler of his father and himself. It is known that after the death of Polycrates, Syloson received the government of Samos from Darius, who had in the meantime become possessed of the little state, no longer protected by Egypt, which had itself

fallen under Persian domination, and Pythagoras probably did not wish to propound his views under a despotic viceroy. Aulus Gellius, discussing the comparative Chronology of Greece and Rome (Noctes Atticæ, lib. xvii., cap. 21), says Pythagoras came to Italy during the reign of Tarquin the Proud. Solinus (cap. 16) and Cicero (Tusc. Quæst. lib. 4) state that he was in Italy under the consulship of Brutus, who had rebelled against and dethroned the Tarquin. Those, therefore, who, like Ovid, contend that Numa Pompilius was a Pythagorean must be in error, unless the received dates are wrong and our philosopher was born before the forty-eighth Olympiad. Before settling at Crotona, he visited Sicily, and a prince or chief of the Phliasii named Leon, wondering at his refusal to accept the fees or gifts of money usually paid to those who called themselves "wise men," asked him *Tis εἴμι*; what he did in the world? Said he, "I am a lover of wisdom"—a *φιλόσοφος*, thus originating the word—and being asked for a definition, answered, "All life looks to me like a national assembly, "at which some strive for merchandise, which to them seems the most "desirable possession, others hunt for glory and power, but philosophers "seek after truth." Those, he declared, were philosophers who enquired into the origin of the worlds, the paths of the celestial lights, their size and distance, the nature of animals, plants and rocks, and generally all who tried to understand the why and wherefore of everything in the Cosmos.¹ He did not stay in Sicily long, but went on to Crotona, a rising town, then about 150 years old, where we will leave him for a while, in order that before discussing his special tenets we may glance at the various philosophies he must have enquired into in his travels. Southern Italy, *Græcia magna*, was then as thoroughly Greek as North America is English now; every important position had been seized by some colonizing party.² Crotona was Achæan, and its specialty appears to have been athletics, so that it was a congenial home for the muscular philosopher with whom we are dealing.

Philosophy and religion have ever been inseparable, and both have been everywhere closely allied with astronomy and physics. "Whence and whither" is not only a most important personal question, but it relates to everything that is not the ego. Cosmogony is, therefore, treated of in all sacred scriptures, the people being told by their leaders in science (usually honoured by being entrusted with the worship of Supreme Beings and the care of religious observances) how they thought the world was made and life began. This is so natural a development

¹ This corresponds to the main divisions of castes in India; see *postea*.

² The same was the case west of Italy, also on the Northern or Mediterranean shores of Africa, as far as the Straits or "Pillars of Hercules."

that it may continue to be the rule; the present feud between science and religion will probably be healed. In a couple of thousand years the world may be told about our period as one when people thought the Nebular hypothesis was an article of faith and radiation the principle which vitalized the universe; Darwin and Spencer may be considered the founders of our belief, which may then perhaps have lived its time and died.

I see no reason to question the general accuracy of what may be called the ethnological part of the Noachian myth.¹ The sons of Japhet or the Indo-European races, usually called Aryan, very likely did spread east and west from the hill country where the Tigris and the Euphrates rise, expelling the older Turanian races from the valleys of those rivers. In no other way is the similarity of the root words of Sanscrit with its Indian derivatives or congeners to Greek, Latin and German so easily explainable. Nor is the speech of the Keltic and Slavonic peoples altogether alien, while some venture to say that the African Berbers are of Aryan origin, pre-Keltic, and connected with the Iberian race, once occupying the Appenine as well as the Pyrenæan valleys, but now surviving only as the Basques. But of the time or times of the great Aryan movement we know nothing. We have some seven thousand well authenticated years of Egyptian history; we already know there was a scarcely less remote high Assyrian civilization, but such periods, long though they be, are as nothing to the time required for a tribal, much less for a national belief to grow into even such shapes as we see dying out among our own aborigines of the neolithic epoch. For primitive views and customs to have developed into such finished forms as Pythagoras found in Egypt, India and Persia must have occupied æons. We are compelled at least to adopt the Egyptian view as indicated by Plato, where he narrates that the priest told Solon the Greeks were but children, for Egypt had a history of twenty-five thousand years, and we must largely extend the two thousand between Noah and Christ, deduced from the Mosaic chronology, however strongly insisted on as an article, forsooth, of faith, by St. Augustine and others, the succession being not yet quite extinct. The Aryan myths, distinct from Egyptian or Semitic, in the most ancient form available, are embodied in the Rig-Veda of India; and in reading the translations which have during the last century made it accessible to

¹ This opinion by no means relates to the Ark method of avoiding an imaginary deluge. Pythagoras possibly had the opportunity of comparing this part of the Hebrew myth with that of the Zoroastrians, who supposed, instead of a ship, a cave made in a mountain side, which was artificially lighted, and served as a refuge from deluge and from snow for several years. See the Zend Avesta, any translation; James Darmstetter's preferred.

western people, we must conclude that it is the liturgy of a very ancient race indeed, older it would seem as to its civilization than Egyptian or Assyrian, though in its present form it does not much antedate the third century B. C. The system it embodies and consecrates, though encrusted with sacerdotalism the most restrictive, and class legislation the most artificial and minutely worked out, seems to have had its origin in naturalism; the phenomena of nature having been closely studied and in due course personified and deified by an educated class for the readier comprehension and machine-made faith of a debased commonalty. Possibly the process was reversed; it matters little to us for the present discussion. The word Veda is from *vid*, to know; the German *wissen*, our *wit*=knowledge, science. The sun and the moon are the first objects of notice, then follow the dawn, the sky, the earth, the wind and other storm-powers, fire and water. We can trace the same order in the Greek system,¹ thus the Sanscrit *dahâna*, the dawn, in the sense of shining, from *dah* to give light (which, notwithstanding objectors, seems allied to the German Tag and the Latin dies=day) is thought to be the Greek half-goddess Daphne, the first love of Phœbus; she disappears as he touches her:

Ipsis

Morsibus eripitur, tangentiæque ora reliquit.

A more condensed account of the Indian Cosmogony and of the political and religious systems Pythagoras found under the Himalayas is given us in the laws of Manou; date, perhaps 300 years B.C., though there are some reasons for dating the code at the beginning of our era. A code like this indicates much earlier work, as our "Revised Statutes" point to preceding legislation. It is necessary for our purpose to examine it, but the following extracts must suffice here:—

Manou sat, absorbed in meditation, when the wisest among his followers, saluting him, approached, respectfully asking him to discourse of the Order established in the world. Then answered Manou: This world was darkness, with nothing distinguishable or distinctive; it was as in sleep. Then He who exists of Himself, having used His energy, appeared of His own accord to dissipate the darkness. He has

¹ The Greek forms of the myths are the most artistic, having been woven by the poets into richly embroidered imagery. Max Müller has led the way in their interpretation, which has been carried very far by others, almost beyond the bounds of probability. Thus Max Müller says Kephalos is an old name for the sun, Procris for the dew. Then "Kephalos loves Procris" means "the sun kisses the morning dew." Mr. Cox thinks Niobe personifies the mist, her children, pierced by the arrows of Apollo, being the clouds, dissipated by the rays of the sun. Her change into a stone refers these to the hardening of the moisture through frost into ice, and when she sits weeping on her rock her tears are the drip from the mountain mist.

no parts, He is eternal, incomprehensible, and contains within Himself all created things. By thought He first created water and placed seed therein, which became a golden egg, as brilliant as the sun, in which He Himself was born, in the shape of Brahmâ, the original father of all the world. In that egg He stayed for a year, and then, by the efforts of His will alone, He divided it into two. Of these parts He made Heaven and Earth, and between the two Air and the eight Cardinal points and the everlasting dwelling place of the waters. (The waters were called Nârâs, as they were his first resting place, and homoiophony suggests a connection between this word and the Greek sea-god Nereus.)

From Himself He took spirit, thence the sentiment of individuality; the ego which knows its own personality. Also the soul and the five organs of sense, which perceive material things. Taking subtle particles of these six, whose powers are unlimited, He created all things. Also the troops of Divine Beings, gifted with life. Also fire, the wind, the sun, the division of time, the places of the planets and of the moon, the river, mountains, plains and rough places. Also self-denial, speech, pleasure, desire, anger. He divided the just from the unjust and gave to His creatures conditions opposed to each other, such as pleasure and pain.¹

For the multiplication of individuals He made the Brahmin, the Kchatriya, the Vaisya and the Soudra, who sprang respectively from His mouth, arms, thighs and feet. Dividing His body into two, the Lord became male and female (and thus the creation proceeds; birds, insects, plants, etc., being brought into existence in turn.)

As to time, it is said that eighteen winks make a Kâchthâ, thirty of these a Kalâ; thirty Kalâs a Mahoûrka, of which again thirty make a day and a night. (Thus, a Kâchthâ equals 3.2 seconds). But, for the Gods, a human year is only one day and night — day while the sun is moving north, and night when it returns. (How close the connection with astronomy of this early religion)! For Brahmâ, four thousand years of the Gods make one epoch, the twilight preceding it is so many hundred years, also the twilight which follows it. (This epoch I make to be 1,460,000 years.) Again, the four human ages make 12,000 years, which is one year of the Gods; a thousand years of the Gods make one day for Brahmâ, and his night is the same. (That would make Brahmâ's day and night 24,000,000 years.)

As to physics, it is said that in the creation He (the spirit which is in Brahmâ) produced the ether, which was the quality of sound. This, by transformation, caused air, pure and powerful, vehicle of

¹ The monism of this creed should be carefully considered.

cdours, to which tangibility attaches. Air, in transformation, gave light, which dissipates darkness, and introduced the property of colour. Light, transforming, produced water, with the property of taste, and water earth, with that of smell.¹

The lapse of time since the creation began is put in this way. The age of the Gods multiplied by 71 is a period of Manou (852,000 years?) and these periods are innumerable, the creations and destructions of the world. The Supreme Being repeats them *ad infinitum*, as a child at play.

Laws follow, in great number, respecting caste. In everything the Brahmin is supreme, the Soudra the meanest slave. Superiority is given among the Brahmins by knowledge, among the Kshatriyas by courage, among Vaisyas by riches, among Soudras by nothing but age. This book of Manou is prescribed as the chief subject for Brahminical study, and, among other matters, it treats of transmigration, which is of three kinds, resulting from works, good or bad, and the end of all is final deliverance, when the soul needs no further purifying and has not to suffer again the labours and pains of re-incarnation.

Rules of conduct are strictly prescribed. Of students, the code says one should not speak without being spoken to, or answer irrelevant or misplaced questions. Even when well knowing the subject a wise man will behave as one of a simple mind. It declares that those who are qualified should not disseminate knowledge where there are not the requisite virtues, riches or obedience — any more than one should sow grain in barren land — and it is better for one who can interpret the Veda to die with his knowledge than to scatter it on sterile soil.

We get nothing as to the end of the world until we take up a somewhat later book, the Visna Purâna, where we learn that the end is to come through fire, and this is acknowledged by all authorities to be one of the myths common to all the branches of the Aryan race. We find it, *e.g.*, in the Norse Eddas. In Snorre Sturleson's, 1178-1201, there is a winter of the world as well as its combustion. In the latter, Surtr throws fire on it, the sun is darkened, the stars fall, vapours and fire whirl and lick up the very skies, while the earth sinks below the sea. Heraclitus and the Stoics held the same doctrine, though they did not express it in such lurid words. The Aryan Gauls believed it — *teste Casare*. The second Epistle of St. Peter, in our scriptures, shows how deeply it filtered even into Jewish thought.

Incidentally we may glance at Buddhism. The extremely rigid rule of Brahminism naturally brought forth rebellion, and a great ascetic, one Sakyamouni (the wise man among the Sakya family), a

¹ Cf. Thales, who said the earth was formed by a precipitate from water.

prince of a territory in northern India, named Siddartha, was led to take the lead therein. He was a Kshatrya by caste. Meditating on the system of classes he saw around him, he became a pessimist, and, while adopting the Vedic cosmogony, with its doctrine of re-incarnation, he seized on the central idea of the power of thought, and inculcated charity, patience, knowledge, courage, contemplation, as means of becoming indifferent to sensual pains and pleasures, and ultimately, after a variety of transmigrations, reaching a state of Nirvana, or absolute escape from existence—which, if existence be an evil, must be the *summum bonum*.

Siddartha died in the fifth century before Christ, so the rebellion he headed was only "in the air" when Pythagoras visited India, and, however fascinating the study of the Buddhist system may be, with its many parallels to Christianity, with a greater number of adherents than any other faith, it does not bear on the present thesis except as proving the firm belief of the Indian population in metempsychosis. Absolute and immediate extinction would otherwise have been the logical revolutionary doctrine. This Sakya, we may note, had a band of disciples who lamented his death, honoured him afterwards, and their successors deified him. Superstition affirmed that he had no physical body, no bones or blood; it was a spiritual body only. Buddhism spread with great rapidity, owing to its monastic system; it had become powerful before Alexander and his Macedonians crossed the Indus. It is of some interest to observe how admission to the society it created was regulated; it was a community as to goods, resembling in this the early Christian practice. It has been crushed in India proper by the persistence of the Brahmins and the proselytizing fervour of the Moslems.

The Assyrian cosmogony is a rather complicated matter to unravel. We have a tablet found in the library of King Assurbanipal, which gives the following account:—

"When as yet the heaven above and the earth beneath was not named, and the primeval ocean who begot them and Tlamat (chaos) who bore them mingled their waters: when no land was yet formed, no seed was visible, and the Gods had called nothing into being; when no name was named, no fate fixed, the Gods were created, Lukmu and Lakan were called into being. Ages passed and then Apshar and Kishar were created. Long were the days before other Gods came forth. Then did Apsu and Tlamat rebel against their rule, and Tlamat gave birth to a brood of monsters, to wage war upon them. The news was carried to the chief of the newly-born Gods, who ordered them to go forth against Tlamat and her brood, but they would not. At length Marduk came forward and was endowed with great strength and invincible weapons, who met and slew

"Tlamat, and of one-half of her skin he made the heavens, then he established the earth and the under-world. Next, he made the stars, the abodes of the Gods, and the signs of the Zodiac, and he marked out the year into twelve months¹ and set the moon in the sky to fix times and seasons." (The creation of beasts of the field and of creeping things followed.)

It seems that while several distinct nations occupied the great valleys of the Mesopotamian rivers, each had its protecting deity, and, naturally, when Hammurabi made Babylon pre-eminent, the Babylonian Marduk (Merodach) was advanced to the chief position. Under Sennacherib he was carried to Assyria, but under Assurbanipal their gods were restored to the Babylonians, to their great delight. Assurbanipal's date is given as 668-626 B.C., a period when mighty movements were in progress, revolutions in Empires and in the realms of thought. It was shortly before the Persians seized the reins of power and imposed upon the ruling classes, at least, their system of philosophy. Herodotus speaks of this, and says: "They have no images of the Gods, no temples or altars. . . . their work is to ascend the highest mountains and there to offer sacrifices to Zeus, which is the name they give to the whole circuit of the firmament. . . . At a later period they began the worship of Urania . . . whom they call Mitra . . . When all is ready, one of the Magi comes forward and chants a hymn, which they say recounts the origin of the Gods." These forms were perhaps those of Anatolian Mazdeism, then prevalent, or they may have been the ritual enjoined by the first Zarathushtra, and the same hymns as the Gâthas, still chanted by Parsee priests. Herodotus wrote in the fifth century before Christ. In the fourth century the second Zarathushtra, the restorer, (our Zoroaster) is supposed to have further systematized the religious laws and observances, and to have codified them. (The Avesta, written in Zend, is thought to be a truthful version of this code, though revised under the later period of the Parthians, and says that Ahura Mazda in the beginning inhabited the skies, intangible and invisible, except when He revealed Himself to Zoroaster. Then asked this favoured one: "What are the words which thou didst speak, before the Heavens were?" And Ahura, the spirit of light, replied—"The will of the Lord is the rule of righteousness: Happiness hereafter is his who in this world serves the Lord; the Lord makes Kings to reign who succour the poor. . . . These words I spake . . . before the Creation of

¹ The Assyrian division of time, of the circle into degrees, of weights, measures and money was duodecimal, and made its way through the Phenicians into Europe, of which traces still remain—12 pence to the shilling, 12 inches to the foot, 12 hours from midnight to noon, etc.

"Heaven, of the waters, of the earth, of plants — before the creation
 "of four-footed kine, before the birth of the first man, before I had
 "formed the mass of the sun, after I had created my archangels."
 Zoroaster adds a cholium, that "the will of the Lord" teaches Him to
 be supreme: "the rule of righteousness" shews Him to be the moral
 teacher of all. "Happiness in the hereafter" proclaims the benefits
 that good thoughts bring. The word "Lord" shews Him the end
 of Creation, possibly inferring that all creatures return to Him. "He
 makes Kings reign" confers on Zarathushtra the kingdom of the con-
 science. It would be useless to dilate on the details, all of them given
 in the Zend Avesta, best translated by James Darmstetter. The first
 animal created by Ahura was the Bull, whose body was slain by Ahri-
 man the evil spirit, *i.e.*, Death followed on the heels of life. One
 of the good creatures of God was Fire. The Gâtha runs thus (chanted
 in unison): —

To Fire the sun of the Lord most wise—holy and purifying.⁽¹⁾

To Fire the useful.⁽²⁾

To Fire our most excellent friend.⁽³⁾

To Fire the universal.⁽⁴⁾

To Fire most swift.⁽⁵⁾

To Fire the benevolent.⁽⁶⁾

To Fire the glorious.⁽⁷⁾

Then we have Fire which both eats and drinks (animal life), which
 drinks, but eats not (vegetable life), which neither eats nor drinks
 (lightning), and Fire, the special impulse, (of the priest, warrior, hus-
 bandman, etc.).

It would seem as if in the conflict of races and religious views which
 was settled for a short time by the union of the nations of the whole of
 the great Euphrates and Tigris valleys, upper and lower, under the Per-
 sian kings, the philosophy of the old Sun-worshippers, who honoured
 Fire as the representative of that supreme natural force, prevailed
 over the grosser idolatrous practices of the people of the old Assyrian
 empire. Pythagoras, on his way to India, if he did not meet with
 Zoroaster himself, certainly had the opportunity of studying his philo-
 sophy. It was simple, which accounts for its long duration. The
 religion afterwards associated with it in the form of the worship of
 Mithra, permeated the Roman Empire and even gave to it for a ruler
 Heliogabalus, one of its priests. It was reformed and persisted in the

(These refer respectively (1) to the Fire of Sacrifice, (2) to household
 Fire, (3) to bodily heat, (4) to warmth in the air, (5) to lightning, (6) to the
 fire burning before Ahura Mazda, (7) to the Majesty residing in Kings.)

East until Islam came into conflict with it, when, on the field of Nahavand (631 A.D.), the Arabians under Omar gained a decisive victory over the Guèbres (Giaours, infidels, from the Arabic *Gaur*, unbeliever) killing 30,000 and driving 100,000 to death by drowning. A part fled to an island in the Persian gulf, thence to India, where, as Parsees, about 100,000 are to be found, still Aryan in type. Of the metaphysical tenets of Zoroaster only one needs mention here: "Immortality will come to the living at the last" (Yast xix, 389, 392, 395).¹ Gibbon's account of the Paulicians, chap. 44, may be read in this connection, and some will see in the Mithraistic impulse the origin of the Knights Templars, of the Protestant Reformation, and of the devil worship which obscurely persists in Europe still.

In these sketches, those features only have been outlined which bear upon Pythagorean doctrine and practices, and it is now time to examine what they were.

The general account which seems most suitable for quotation is that of Ovid. Few passages in the whole range of Latin poetry are more beautiful than those describing the popularly received cosmogony of his day, with which he begins his *Metamorphoseon*. It is curiously different from modern views, for while we always speak (and far too boastingly) of human progress, Ovid divides the time since creation into golden, silver, brass and iron ages, and calls the oldest far the noblest. Then he recounts the myths of the Greeks, in such a way that they tell their due lessons in ethics, elegantly but forcibly, and at the close of the work he completes the song which began with Chaos and the origin of things with an account of their nature as explained by Pythagoras:—

"In Crotona," he says, "once lived a man, by birth a Samian, who left that island and its rulers because he disliked their despotic form of Government. High as the Heavens are, his mental powers held fellowship with the Gods who dwell therein, and by reflecting he perceived what to the natural eye is hidden. . . . He taught his silent and admiring listeners the origin of this mighty world, the reason why things are and what their nature. He explained his conception of the Deity, told whence come the storms of snow, what was the cause of lightning, whether Jupiter or the winds were thundering in the cloud-burst, what made the earthquake, what laws governed stellar motions; in fine, all the mysteries of the unknown. He was the first to forbid the use of flesh for food, in words like these . . . 'Cease, mortals, to defile your frame with food

¹ Akin to the Assyrian cosmogony, but without its subordinate divinities, was that of the early Hebrews, given in Genesis I and II, and in Job, XXXVIII and XXXIX. The Avestan Amshaspands seem related to the Jewish Archangels, but the Jewish celestial hierarchy appears only to have been properly staged after the Captivity.

"you ought to shudder at. There is corn, there again are fruits hanging on
 "heavy-laden boughs, grapes and tasteful vegetables. . . . Milk is
 "not denied you, or honey, scented by flowering thyme. The earth is lavish
 "of her riches and provides you banquets without slaughter or bloodshed.
 "Wild beasts resort to flesh to satisfy their hunger, yet not all of these . . .
 "Amid so much abundance which the earth, that best of mothers offers, will
 "nothing please you but to munch the gashed joints with ferocious
 "teeth. . . . Can you not otherwise allay the cravings of a voracious
 "and undisciplined maw than by destroying another life? The times of old
 "we call the Golden Age were happy in the yield of fruit and of the crops
 "the soil brings forth. . . . No snares were laid, no fraud was to
 "be feared, but when some futile innovator envied us and gorged his hungry
 "paunch with animal food, the way to cruelty was opened wide. . . .
 "the evil spread. As the first sacrifice the boar was doomed because with
 "his snout he roots up seeds. . . . Next the goat . . . in revenge
 "for his destroying vines. Each suffered for its particular fault, but what
 "did the sheep deserve, that inoffensive race . . . whose milk supplies
 "us nourishment, whose fleece gives us soft, warm clothing, and who avail
 "us more living than dead? What again did the ox merit, a creature without
 "fraud or guile, innocent, simple, born to be patient under toil? The man is,
 "indeed, ungrateful and unworthy to reap a harvest who can bring himself
 "to butcher this tiller of the soil so soon as relieved from dragging the heavy,
 "curved plough. . . . And since a Divine spirit makes me speak, I
 "will open as it were the skies. . . . It delights me to wander among
 "the stars of the high Heavens, to be wafted to the clouds, and, leaving
 "the surface of the earth and its dulness, to mount the heights and look
 "down upon the incertitudes and stupidities of men. . . . Ye who are
 "alarmed by the fear of chilly death, why do ye dread the Styx, the gloom,
 "the empty names and dreams of poets? Do not think you can suffer the
 "least harm by your remains being burned on the funeral pile, or by their
 "mouldering away. Our souls do not die, but, leaving their former tenement,
 "are received into new homes, and still live on. I, myself, was Euphorbus,
 "the son of Panthous, who was slain by a spear-thrust in the chest by
 "the younger son of Atreus. I lately saw and remembered the shield I used
 "to wear, it is in Juno's temple at Argos. . . . Nothing becomes ex-
 "tinct, everything changes, the soul wanders, and from one abode drifts
 "hither and thither and occupies some other. The souls of wild animals
 "may occupy human bodies and our spirits theirs, without at any time
 "ceasing to be. As pliant wax impressed with new figures does not pre-
 "serve its old shape, but is none the less the same wax, so the soul is
 "ever the same, but changes into different forms. . . . Nothing in the
 "universe is stable, all things are flowing on and every form is fleeting.
 "Time itself runs in an unceasing stream, like a river, for neither can the
 "river nor the passing hour be still . . . for what was before is left
 "behind, that which as yet was not, lo! it is . . . Mark how the year
 "moves by, in four seasons like our lives. Tender and fed with milky
 "juices, as the age of childhood, is the new-born spring . . . all Nature
 "blossoms, the lovely fields delight in the colour of their flowers, but as
 "yet there is no substance in the leafage. After spring, the year, acquiring
 "force, passes into summer, like a vigorous youth. There is no more robust
 "time than this, none more prolific, none more replete with action. Autumn

"follows, the fire of youth toned down, mature and mild, in temperament
 "between youth and grey-haired age. And last comes winter, which we all
 "shudder to behold, with palsied gait and bald, or, if any locks remain,
 "quite white. . . . Thus is the vigour of the prior term undermined,
 "and Milo, in years, laments to see those muscles flaccid and unwrung which,
 "once firm and knotted, were like those of Hercules himself! Tyndaris, too,
 "grown old, weeps when in her glass she sees a wrinkled face, and marvels
 "why she was twice abducted by impetuous lovers! Even what
 "we call elements do not perish. Nothing keeps its special form.
 "Nature, the Restorer, is always giving new shapes to every figure.
 "To begin to be a different something from what there was before is called
 "birth, and to have done with that is death. Matter which at one time
 "happens to be here is carried over there, but the general sum is the
 "same. I have seen solid earth transformed to sea and the ocean
 "in its turn become solid land. Plains become valleys and mountains are
 "levelled to a plain. Nor will even Ætna always vomit flame."

In the above, there are necessarily many omissions, but the main points which refer to distinctively Pythagorean tenets are clearly and fully stated. But, it may be said, Ovid who wrote this at about the time of Christ, embellished tradition with poetry. We will therefore see what sober history relates.

Aulus Gellius (Noctes Atticæ, Book 1, cap. 9) tells us something about the organization Pythagoras established at Crotona. Those who were there received by the Master as disciples put all their family rights and possessions into a common stock, so that an inseparable society was formed of the nature of the *consortium*. A family in the earliest Roman times was by law and custom *consors*, that is, everything belonged to the family and could not be left away from it by will. The Greek word is more expressive, *κοινωβιον*. But, later, a family might declare itself *dissors*, which in a way is like cutting off an entail, and a law was inserted on the Twelve tables under which persons might go even further and divide possessions among those not belonging to the family. The Pythagorean sodality was, therefore, merely an extension of a recognized usage, for it is probable that similar customs prevailed in most Italian cities, even those in Græcia magna. The Greek words are *σύνκληροί* and *διακληροθέντες*. Pythagoras was applying to a sect of his adherents the principles which prevailed among consanguineous families. His way of matriculating his students was as follows:—First he made a personal survey of the applicants, especially of their features—*ἐφυσιογνωμόνει*—and was thus the first recorded physiognomist. He inquired into their inherited constitution (*totius corporis filo atque habitu*) and, if he thought the candidate suitable for admission, he ordered him placed under discipline for a certain time, as he might judge it requisite in each case. It was never less than two

years; Apuleius says the general rule was five. Those who were under this discipline of silence were called *ἄκουστικοί* or listeners; they being allowed to hear what was being said by others, but not to ask questions or to take notes in writing. When they had thus learned that most difficult of all things, to listen and hold their tongue (*ἐχεμυθία*), they were permitted to speak, to inquire, to write what they had heard and to state what their opinions were, and they were called *μαθηματικοί*; that is, they were studying geometry, gnomonology (or the sciences connected with dialling), music and other branches of higher knowledge which the Greeks called mathematics. Having mastered these subjects they were allowed to investigate the working of the world and the principles of nature and were called *φρονσικοί*. Gellius tells us in his chatty way that one Taurus, a philosophic writer and personal friend of his—they lived in the times of Antoninus Pius—lamented the difference between the followers of learning in the days of Pythagoras and his own, in these words: “And surely it is not satisfactory that “those who rush with unwashed feet (denoting hurry) to the teachers “of philosophy should be devoid of the faculty of reflection, of the “love of ordered rhythm (music), or ignorant of geometry. Yet they “actually do, now-a-days, themselves lay down the law how they shall “be taught! One says, ‘teach me this first.’ Another cries, ‘I want “to learn such a thing, and I do not care for such another.’ A third “wants to begin with Plato’s symposium, on account of Alcibiades’ “discourse, and a fourth with his Phædrus, on account of that of “Lysias. There are, by Jove, some men who ask to be taken into “Plato, not to order their lives by his doctrine, but to be able to deliver “a better speech; not to become more self-respecting (*modestior*), but “more attractive to their associates (*lepidior*)!”

The master said that all things should not be expounded to every one, and he passed over in silence all discussion attempted by outsiders. His followers disliked associating with others; they had many signs and symbols unintelligible to all except fellow initiates. Are the secret societies of the present day, with their three usual degrees, influenced yet by the Eastern methods of Pythagoras? The master wrote no book, the three treatises some say he composed are wrongly ascribed to him, as we must believe. He taught his family daily, by speeches and argument. He recalled the people from luxury to frugality, praising virtue and enumerating the evils of self-indulgence and the misfortunes of cities attributable to that plague. He addressed matrons apart from their husbands, and boys apart from adults, on the principles leading to a happy and reputable life. To the former he inculcated charity and a due respect to their husbands; to the latter modesty

and a desire to study literature and the liberal arts. He told all classes that thrift begat virtue, so assiduously and successfully that ladies would take their gold-embroidered robes and other ornaments of their station and means of luxury and lay them as offerings in the temple of Juno; for, said he, the true ornament of a woman was purity, not dress. He was evidently the Savonarola of his epoch.

The number of his oath-bound disciples is not clearly known. Scme give it at 300, others at twice that tale. According to Polybius their vows of comradeship involved living apart from other citizens, abstaining from all killing (*φόνου*), rioting (*στάσεως*) and disturbing political questions (*ταραχῆς*). They, however, rapidly gained great political influence, and we are told that Pythagoras and his friends administered the affairs of the republic so prudently that it soon seemed to be a state composed entirely of the well-to-do. (*Prope optimatum civitas videretur*). But what were sneered at as his "aristocratic methods" antagonized many interests and prejudices, the Crotonienses being very much like ourselves. They would not submit to a sort of Brahmin caste, a family compact, Eastern teaching under a thin local veneering; so, after about twenty years' experience and enthusiasm, during which societies were formed in other cities of the peninsula, similar in principle and perhaps affiliated in some loose way, a conspiracy was hatched to burn up the adherents of this ancient Puritan in one of their meeting houses. Sixty perished, the rest scattered. The Pythagorean lodges in other parts of Magna Græcia were harried. Whether the master was himself killed is uncertain; one account states that he was found in the house of Milo, one of his set, and murdered; another that he fled to Metapontum and there died, at the age of nearly a hundred. He had married Theano of Crotona, by whom he had two sons and two daughters—all companions of his studies, lights and ornaments of philosophy.

As above stated, Pythagoras committed nothing to writing, nor do we obtain the least scrap of esoteric information from his immediate followers. Only from Philolaus do we get an inside inkling of the facts; as I gather, about 150 years later. It seems that this philosopher had some notes respecting the tenets of the brotherhood, and, when old and stricken with poverty, probably unable to supply even his modest wants, he happened to meet Plato, who was visiting the court of King Hiero, at Syracuse (Sicily), and sold them to him. It is well known that Pythagoras had a powerful influence with Plato, and we may well imagine his joy at securing the precious manuscript. Very little, however, of its contents has reached us. The only fragments we have are what others have copied from him—three or four pages

in all. They occur for the most part in the anthology prepared by Stobæus, in about 500 A.D.

The world, says Philolaus, is one; it began to be at the centre and developed from that upward, for which reason things opposite to that middle are alike, whether below it or above it, since everything began from this nucleus. He places fire at the centre, which is the focus of all things and the house of Jove, and the mother and altar and meeting place and measure of *φύσις*, Nature or being. First then there is this middle of Nature, and around it ten divine bodies dance in harmony (*χορεύειν*). The heavens, the planets, after them the sun, above that the moon, above that the earth, above that the antichthon, after all these fire, like that which is at the centre. All that is above he calls Olympus, but all below, viz.: the space in which the five planets with the sun and the moon are arranged, is the Cosmos. The sun, he says, in a mystical and obscure passage, is of a glassy nature, receiving and reflecting the rays of mundane light and heat. The nature of God, he tells us, is one; stable, formed like Himself and unlike aught else. There is one beginning for all, and the world cannot come to an end, so that suicide is not a lawful act. The beginning was *τό ἐν*, that which was first brought together (*ἀρμοσθέν*) this one thing being the basis, at the centre of the sphere, and is to be called the focus. There are five things, fire, water, earth, air and ether, which is what surrounds all else (*ὀλκός*) and carries the sphere. [There were other men who, later, professed themselves Pythagoreans, and all antiquity attributed to him great skill in geometry and the theory of numbers. "Number," he is said to have believed, "is the soul of the world." The proposition known to us as the 47th of the first book of Euclid, is attributed to him.]

It does not seem that by other quotations, from Cicero, Vergil¹ and other Roman sources, or from the later Pythagoreans we can get into closer touch with this great master. Enough has been given, however, to support the view that the character and the chief details of the Pythagorean philosophy were Asiatic, and that they had their principal source in India. The plan of this paper is not argumentative, it is a simple statement of facts in, as it were, parallel columns of narration. It seems plain that after long travels and studies the philosopher established himself in the region where the great Greek colonies were growing, freedom from control being probably his main object in making the selection. The "aristocratic institutions" against which

¹ Vergil as a young man, inclined to the Epicurean philosophy (Ecl. VI, Silenus), but in mature age was distinctly Pythagorean. Æneid VI, 713 et seq.)

the people of Crotona eventually rose in tumult were not, as say our modern writers, of the Doric type, by which I understand varieties of monarchical rule, as at Lacedæmon, but of Brahmin type, and the attempt to found a superior caste failed of success. Meditation, abstinence, silence — all characteristics of the Indian sages — do not appeal to the active Western mind. The method of holding possessions in common, a primitive custom, still prevailing among our American Indians, was dying out in Europe, and though re-introduced under other auspices, has given rise to other tumults and will yet do so. The prohibition of killing anything endowed with life is so clearly Indian that we need only think of some of its Eastern forms to-day, where certain holy men carry peacocks' feathers to brush the place they wish to sit upon, lest haply they should crush some insect. Metempsychosis, which Pythagoras taught, is held as firmly as ever, both by Brahmin and Buddhist. We may also see clearly that Pythagoras was an adherent of monism, not dualism. There is no trace in his philosophy of the chief elements of Semitic faiths and of the later Zoroastrianism, viz., the presence throughout Creation and the created universe of a principle or spirit of evil, which is not an Aryan belief, not Indian or early Persian, but was ingrafted on Mazdeism by the political needs of the Empire of Cambyses and Darius Hystaspes, characterized the Mithraic system, and was fastened on Europe by the adoption of the Jewish scriptures. The Indian solution of the difficulty this question raises was the denial of the existence of matter or taking matter and spirit to be fundamentally one. The evil spirit is the Sanscrit Bhaga, master; an epithet of God, the name of a Vedic divinity. It seems to have been transferred to the Slavonic bogû (and is, perhaps, the bogey of our nurseries) by the influence of the Turanian races with whom they mingled. Zoroaster II represents it as the devil.

To prove in like manner that Pythagoras adopted his astronomy from the East, it would be needful to show what Eastern science taught, but of this we know very little. The Egyptians knew that the earth was round, and there can be very little doubt that a people who oriented their monuments to particular stars knew of the regular change in their position due to the precession of the equinoxes, though Maspero says that up to this time no old text has been found to prove such knowledge. So of the rotation and revolution of the earth, "Some said the earth was stationary, but Philolaus, the Pythagorean, said it was carried round in a circle about the central fire, like the sun and the moon." How could Pythagoras have obtained even such a glimpse except from a people who built observatories? These existed,

we know, in Assyria, towers being built for the purpose, and it does not require telescopes to teach the true motions of the earth and planets; Copernicus wrote on the heliocentric theory before Galileo. We may very well believe that the Chaldees were acquainted with the facts, as they were observant of eclipses and all stellar motions; also that Pythagoras obtained reasonably correct views from them. In the teaching of them, unaided by established means of observation, he would not be closely followed by his students; and in the hurly-burly of the violent attack upon the sect, their tenets would soon be obscured, false interpretations given to his words, and the astronomical part of his lore come down to what Stobæus gives us—"Philolaus said that the governing power of the universe was in its central fire (fire, the element, being not the literal fire we speak of now-a-days, but rather the source and also the manifestation of energy) which Almighty God occupies and which is the turning point of the whole (sphere)." (Ecl., lib. 1, cap. xxii., 6: ed. Heer.).¹ And again, "Others say the earth "is stationary, but Philolaus, the Pythagorean, said it is carried around "in a circle about the central fire, just like the sun and the moon." It must be admitted that the phrases are not precisely Heliocentric, but the view that the sun is central, if expressed and actually proved by the master, was likely to die out in a generation among the Italian Greeks, who had no such observatories as there were in Egypt and in Asia. Pythagoras doubtless improved his mathematics in the East, for we now know that even the famous theorem that the square on the hypotenuse of a right-angled triangle equals the sum of the squares on the two other sides, which bears his illustrious name, was familiar to the geometers of Hindostan centuries before his time.²

It is instructive to compare the preceding hypotheses of the Genesis with the theory of the present day.

¹ See, for the fullest exposition of Pythagorean philosophy available, *Fragmenta Philosophorum Græcorum, Collegit* Fr. Guil, Aug. Mullachus, Paris, 1881, Firmin Didot & Cie.

² *Ed. Lucas, Recréations Mathématiques.* The Indian method of proof, one of many, gives the figures merely, and underneath them is the one word "Look "



We believe our universe was once a nebula.¹ There is even now what may be called "an invisible veil of nebula over the whole sky." (Prof. Turner, Modern astronomy). In parts thereof the photographic plate reveals to us enormous aggregations of feebly luminous gas. The stars of the Pleiades are enwrapped in mists which extend in wisps from one to another; the great Dumb-bell nebula has a broad ring of nebulosity surrounding its globular mass; Orion has in his sword a nebula which to the eye is huge, but the sensitised plate, by long exposure, shows the whole giant constellation to be wreathed in filmy ribbons and scarfs. We think the stars were formed by the concentration of nebulous matter into spherical forms by the attraction of gravitation, but of the nature and cause of this force we know nothing yet, though we have learned that it acts in the same way throughout the universe. This so-called universe may be limited, and is possibly globular, but we suppose it would require at least 10,000 years for light, which travels nearly 200,000 miles a second, to traverse the assemblage of stars it contains. While stars are being formed, some of the coalescing matter is either left behind or thrown off by the rotation of the principal body and forms planets.

We believe the stars are all in movement, possibly around their common centre of gravity, and that our sun, which is one of them, is rushing towards a point in the heavens where the others seem to be opening out before him, while behind him they are closing in. We see with our telescopes, within many nebulae, luminous patches which we think are stars in process of formation, and we have observed many stars kindle where previously there were none to be seen. We have ascertained that they are composed of similar materials to those we have under our feet, and we have sorted them out into classes according to their different luminosities, which are thought to indicate their various stages of development. We think that as one star differs from another in glory, some emitting more light than others, so there are probably multitudes of dark stars, and that all stars have a regulated life-history of birth, growth, decay and death. Outside our universe of stars, in which the sun is not central, there may be others, also globular, and so on, throughout space, *ad infinitum*. The universe, we think, is bathed in ether, of the nature of which we as yet know very little. Ether, matter, electricity, seem to merge, and to be the Ur-stoff or protyle from which atoms grow.

¹ Herschell used to call it Fire-Mist; it was then thought to be attenuated hydrogen. It is material, for it gives to the spectroscope a peculiar green line (nebulium) and it is now thought by Sir Wm. Crookes to be matter in a fourth state, that of radiance.

As the stars are being formed, the particles coming together clash, and their arrested motion is transformed into light and heat. The earth we live on, a small satellite of the sun, has lost by radiation much of the heat thus originally caused by its concentration. As it cooled, its constituents took on forms which did not exist at its pristine temperature, such as rock, which we call solid, water, which we call fluid, and there were gases left which we call air. Life, then, as now, the result of a chemical process, took different shapes, crystalline or mineral, vegetable and animal, gradually changing as the surface heat diminished and as their environment required. The slow creation ultimately reached man. While there may be other forms of humanity hereafter evolved, it seems that the cooling of the world is not favourable to rapid change, and the "progress of the race" may be an illusory term. We have not formed any estimate of the age of the sun or the planets. It has been calculated that some fifty million years have elapsed since the earth's surface became solid, but most geologists and students of nature multiply that period by ten.

The sun, and doubtless the other stars, rotate, as do the planets, some of which have near them smaller planets or moons, also rotating, which circle around them according to the laws of gravity, as they themselves do around the sun, whose heat, still being radiated, is the main-spring of all the life-movements on their surfaces. The forms of the stellar systems are numerous and, to our understanding, complicated, stars of both equal and unequal sizes and light-giving powers whirling about each other in periods varying from a few days to hundreds of years.

Thus the views of mankind as to the formation of the universe have themselves been subject to evolution.

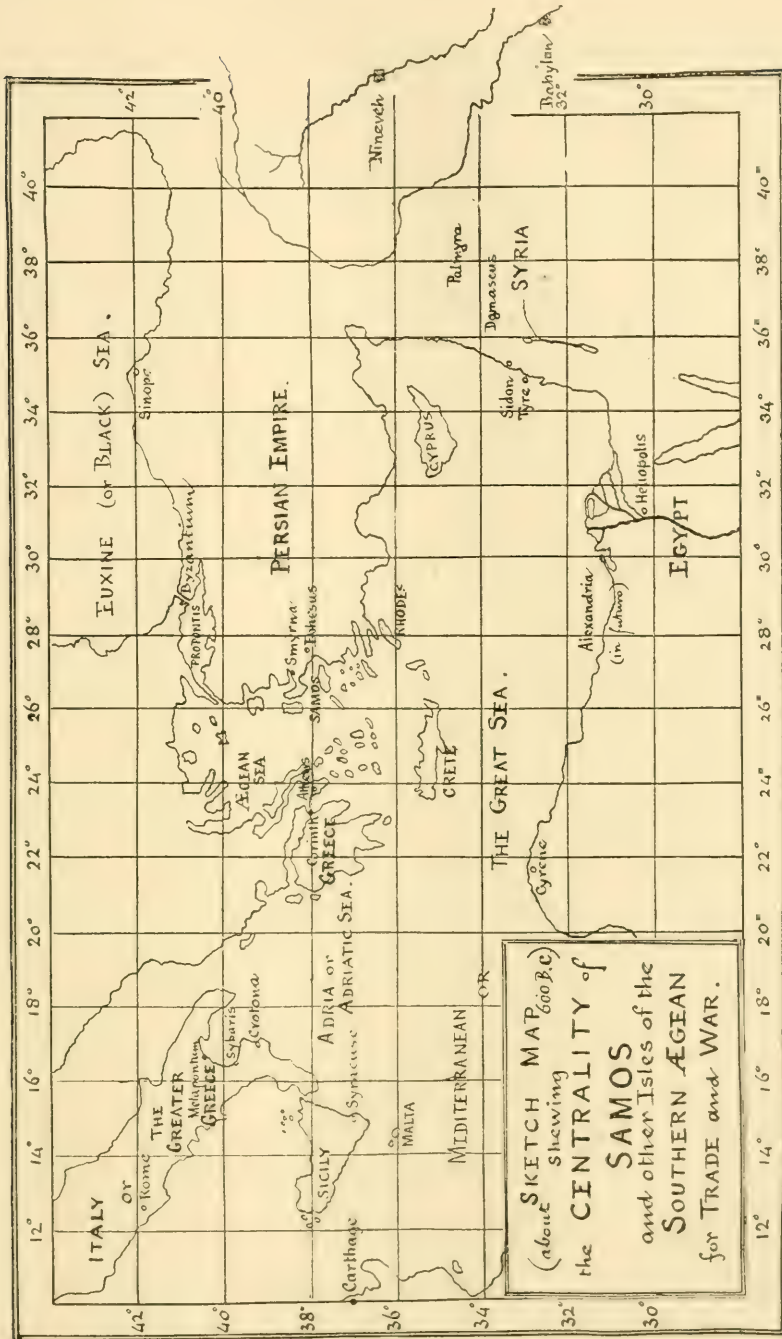
The tenets of many religious beliefs, among them Christianity and Mahommedanism, are dualist, but science is monist; it convinces one of a single Great First cause, one law pervading all space and all time, matter being indestructible though mutable, the law of its existence and of its change enduring from everlasting to everlasting — and this we hold, whatever be the nature of matter.¹ Science hesitates when the question of soul or spirit is approached. "We cannot give ourselves "souls without giving them to our dogs, perhaps to plants. It is "still clearer that a belief in posthumous existence naturally implies "a belief in pre-existence," writes Sir Lesslie Stephen,² and "why,"

¹ Radio-activity, the great discovery of Becquerel, is possibly only the effect of the decay of atoms. Of the construction of atoms from the universal and fundamental diffused material we are still profoundly ignorant.

² An agnostic's apology.

he continues, "should we not accept the theories which suppose a continuous emanation from and absorption into the world soul?" Such considerations are too mystical for present day science, and the students of physics may be said to be inclined to think that mind is a function of matter, so that death is a change which ends individuality. But there is an unworthy timidity about even discussing such questions, born of the fear of such results as came to Pythagoras, and, later, to Socrates who borrowed from him, also to ten thousand others in all subsequent ages and in all lands. Opinion is not yet free.

The cosmogonies we have been glancing at are after all more notable for their points of agreement than for their differences. We have increased our knowledge of physical facts but do not seem to have advanced in metaphysics. Pythagoras brought from the East much knowledge and much thought, and to the Greek school of philosophy, which he largely influenced, we owe all our own. Our repayment to the East of this weighty obligation has not always been so altruistic as gratitude requires.



VII.—*Thomas Pownall.—His Part in the Conquest of Canada.*

By W. D. LIDTHALL, M.A., F.R.S.L., F.R.S.C.

(Read June 23, 1904.)

In an article in the *Antiquarian Journal* of Montreal (Third Series, Volume III., No. 5), afterwards separately issued in pamphlet form under the title of "The Glorious Enterprise," I drew attention to a chain of family relationships and other facts, throwing new light on the various plans of campaign for the conquest of the French dominions in America from 1689 to 1760.¹ It was shown from the official documents that the principal of these plans—those of 1689-90, 1710-11 and 1759-60—were in reality forms of one and the same; that they all originated in the province of New York; that they were the work of one group of men united together by close bonds of blood or marriage—a part of the manorial gentry of the province—that this plan and the military and topographical knowledge connected with it were a kind of family inheritance; and that the outlines of the plan constituted the only practical scheme of invasion of New France; the only one by which success was possible; and the actual one by which success was at last attained. It was shown that its originator was Colonel Peter Schuyler, of Albany, in 1689; that Sir William Phips and General Winthrop were not the true leaders, but in reality secondary actors, in the invasion of that time; that the projected invasion of 1710-11, according to the scheme of Colonel Samuel Vetch, was a resuscitation of the idea, originating in the fact that Vetch married Schuyler's niece, the daughter of Robert Livingston, one of the chief agents in the matter, and lived among them at Albany; and that the final plan adopted by William Pitt, and assigned by him to Amherst and Wolfe for execution, was the same thing once more, proceeding from Lieutenant-Governor De Lancey, grandnephew of Peter Schuyler, and was drawn from the same store of tradition.

Those concerned were well aware of the breadth and consequences of the idea. In 1689, the Albany agents to the other colonies referred to it as "soe glorious an enterprise," "soe noble a designe," "such a noble design." In 1709, Vetch wrote of it as "this noble enterprise," "this noble designe," Quarry as "that noble design against Canada"; in 1711, Gov. Hunter as "this glorious enterprise"; The Sachems of the Five Nations called it "this great design"; others

¹ Some minor errors crept into this pamphlet owing to its being hastily rewritten after loss of the original manuscript.

"that justly great attempt," "so promising an enterprise," and so forth. I have therefore applied the phrase "The Glorious Enterprise" to the traditional plan itself. The issue was plainly put in such phrases as that of Caleb Heathcôte, "it is impossible that we and the French can both inhabit this continent in peace," and "until the tryall is over and 'tis known whether North America must belong to the French or us."

Its essential features were (1) combined action by all the British colonies; (2) a fleet attacking Quebec; (3) an army making a supporting attack on Montreal by way of Lake Champlain; (4) the assistance of the Iroquois. As first conceived, it was indeed a bold and original design, aiming at the almost undreamt-of. And even towards the end it contrasted strongly in its comprehensive simplicity with the confused projects concerning the war in America among which the English military groped about. We know that the scheme failed in 1690. The determining cause then was the outbreak of smallpox among the Indians at the foot of Lake Champlain, which relieved Count Frontenac from the fear of an invasion of Montreal, and left him free to withstand the naval attack of Phips upon Quebec. In 1711, it failed again, through the cowardice and incompetence of Sir Hovenden Walker and General Hill in the Gulf of St. Lawrence. The cause of its revival in the end was the utter failure of other plans of campaign, such as Shirley's against the Lake forts; Braddock's against the posts on the Ohio; and Abercromby's against Ticonderoga. A great disaster was impending over the British colonies—their forces were exhausted, the Indian allies were on the eve of going over to the enemy, and the outlook was turning seriously in favour of a French future for America. Another generation of growth for the population of the New France, together with a rush of immigration from Old France into the West, and a people would have grown up firmly rooted in Canada like a nation of Europe, who might perhaps have been temporarily overrun, but whose permanent conquest would have been very doubtful. The "tryall" was still in the balance "whether North America must belong to the French or us," and was in danger of being finally decided not in favour of the British.

Two men, at least, knew what was needed in that critical hour. One was James de Lancey, Lieutenant-Governor of New York, who set forth in clear terms to the Lords of Trade the only means "to distress the French in Canada": but, although he had some influence in England, he well knew that no colonial adviser was of sufficient weight to move fleets and armies by any direct action of his own, in the then state of mind towards provincials of the titled incompetents ruling at London. The other was De Lancey's friend, Thomas Pownall, Governor of Massachusetts and Lieutenant-Governor of New Jersey, brother of the

Secretary of the Lords of Trade and friend of the Earl of Halifax, their President. He was master of the necessary knowledge and influence, possessor, too, of what was far better, a most brilliant combination of penetrating mind and enterprising character. Coming to America in 1753 as secretary to Sir Danvers Osborn, Governor of New York, who died on entering upon his office, he was thrown closely in touch with De Lancey, and took part in the latter's great Colonial Convention of 1754 at Albany, where he caught from the men of "experience and judgment" there assembled "the actual state of the American business and interest."

Towards the end of 1756, Pownall, dissatisfied with the poor progress made up to that time, returned to England and wrote a memorable letter to Lord Halifax which revolutionized the conduct of the war. He pointed out "that after the English had been repeatedly disappointed in their attempts to penetrate the country by way of Crown Point and Lake Champlain, and had lost Oswego and the command of Lake Ontario; considering the reason there was also to expect the defection of the Indians in consequence thereof, there remained *no other alternative but either to make peace or to change the object of the war*, by making a direct attack up the River St. Lawrence, upon Quebec itself; urged to a radical destruction of Canada." "The writer of these papers," he says (1) "came over to England in the latter end of the year 1756 to propose and state these reasons, nearly in the same form as afterwards repeated by the paper that follows; particularly the necessity of two fleets and two armies; one army destined for the attack, the other under orders to invest Canada by taking post somewhere between Albany and Montreal, so as to cover the English colonies, one fleet to escort and convoy the army up the River St. Lawrence and the other to cover and protect the sea line of the colonies."¹ The object was adopted. Why nothing was done in the year 1757, and why no more was done in the year 1758 than the taking of Louisbourg, will be explained on a future occasion; the ideas contained in the following paper lead to the rest:—

"IDEA OF THE SERVICE IN AMERICA FOR THE YEAR 1759.

Boston, December 5th, 1758.

"If the point disputed between us and the French be determinedly and precisely understood, the manner of conducting it may soon be fixed. If we are still, as we were at the first breaking out of the war, disputing about a boundary line, and for the possession of such

¹ Administration of the British Colonies, Appendix IX.

‘posts, communications and passes as may be a foundation to our possession of a future Dominion in America, we are still engaged in a petty skirmishing war. . . . If we have changed the point and brought it to its true issue, its natural crisis, whether we, as Province of Great Britain, or Canada as the Province of France, shall be supreme in America, then the service to be done is a general invasion of Canada in conjunction with the European troops and fleet; then is our natural strength employed and we must be as naturally superior. This being fixed, the next point is where the real attack must be made. The same reasons that show the necessity of such an attack show that it *will never effectually be carried on over land*. . . . Experience has now shown that the possession the enemy has of the posts of strength would render the passage to Canada by land the work of a campaign, even with success, but finally also the success doubtful. (The going to take possession of the country in 1760 after Quebec had been taken in 1759 proved ‘the work of a campaign.’)

“The road to Quebec up the St. Lawrence is possessed by the superiority of our marine navigation. There is neither danger nor difficulty, nor do I see how there can be any opposition to hinder the fleet getting up to the Island of Orleans; and a superior army in possession of that may by proper measures command the rest of the way to Quebec.¹ If our army can once set down before Quebec it must take it; if Quebec be taken, the capitulation may at least strip Canada of all regulars; after which the inhabitants might possibly be induced to surrender. . . .

“But although this attempt on Quebec by way of the St. Lawrence River may be the only real and will be the only effectual attack on Canada, yet one other, if not two, false attacks will be necessary, one by way of Lake Champlain, the other by way of Lake Ontario. What by way of Lake Champlain may, as far as Crown Point, be offensive, and should then change into a defensive measure.” . . . “As to action on Lake Ontario, an appearance of an attack by that way must greatly alarm the enemy at Montreal” (and serve other purposes).²

Pownall, in claiming to be the first proposer of his measures, evidently refers to being the first in England and in official quarters there.

“The first paper,” he says, “was written at a time when the subject was entirely new; scarce ever brought forward to consideration here in England; and when authentic accounts of the true state of

¹ “Did not the event literally justify this?”

² P. 249.

"the country, as possessed by the English and French, were with great difficulty, if at all, to be obtained; and, I may venture to say, *utterly unknown to our military.*"

The consequence of these doings was the favourable turn to the British campaign. The results were no less than the conquest of North America, the establishment of both the British Empire and the United States, and the dominance of the world by Anglo-Saxon institutions. This statement is a new and a broad one, but is it incorrect? The proofs are in the Documentary History of New York. Schuyler, Vetch, De Lancey, Pownall, Pitt and Wolfe were the six bright stars of the "Glorious Enterprise." Perhaps Saunders, too, should be included. The work of Pownall was *sui generis*—masterly, great-hearted, the equal of the others in sweep of vision, a link as necessary as theirs in the success of the "noble designe."

As the present paper is merely a note, this is not the place for an extended account of Pownall. He was born in England in 1722 and died there in 1805. A very full biographical article upon him is contained in Volume XVI. of the Magazine of American History, and is embellished with a fine portrait. He was a man of rich qualities of both heart and intellect, and an intimate and loyal friend of Benjamin Franklin even throughout the Revolution. He is generally acknowledged as the author of the idea of United Empire, and had his enlightened views as a friend of America obtained proper hearing, there might have been no Revolutionary War. But I believe that in the above lines and in the pamphlet referred to I am calling attention for the first time to his greatest work.

ROYAL SOCIETY OF CANADA

TRANSACTIONS

SECTION III.

MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

PAPERS FOR 1904

I.—*Note on an Apparently Accidental Formation of Frazil Ice in a Cryophorus.*

By PROFESSOR JOHN COX.

McGill University.

(Read May 19, 1903.)

In the ordinary experiment with the cryophorus the lower (empty) bulb is placed in a freezing mixture, the water vapour is condensed, and the rapid evaporation in the vacuum so produced soon causes a film of ice to form on the surface of the water in the upper bulb. In the course of a lecture to the students of the First Year Arts last January, I performed this experiment for perhaps the hundredth time with a result which I had never observed before, and which seems worth placing on record.

The experiment had for once failed at the preceding lecture. The freezing mixture of snow and salt was accordingly made with special care, and well bedded round the bulb. But there was again no result, and I began to think a minute crack had occurred, letting down the vacuum of the cryophorus. As the lecture went on I occasionally looked at the cryophorus, but no ice was formed for about half an hour. A minute or two afterwards a confused mass of long needles formed and grew rapidly, projecting in all directions, many of them vertically downwards. The formation was so different from the usual cake adhering to the sides, that I removed the instrument and carried it round to the class, holding it still vertical, in order that they might examine it more closely. To my great surprise the mass of needles, loosened by the movement from the sides, sank slowly to the bottom and remained there with, perhaps, one-third of an inch of clear water above it. I called the attention of the class to this curious fact, and suggested that it might have some relation to the alleged formation of frazil and anchor ice in the St. Lawrence, though this was said to occur where the water was disturbed, whereas the cryophorus was resting on a pier with independent foundations and free from all vibration.

I have repeated the experiment a number of times with varying conditions but have failed to obtain the result again. In the actual case it seems likely from the length of time before the ice formed and the steadiness of the supporting pier that the water was considerably supercooled. I have tried steadiness with slow cooling by freezing



mixture, and with rapid cooling by pouring liquid air over the lower bulb; and also slow and rapid cooling while the water was slightly agitated by tapping. The instrument has been used after standing for long periods in air at the ordinary temperature, and I have stopped the process at all stages for a few minutes and then reimmersed the bulb. The only result has been the ordinary flat cake, though sometimes a few needles have been seen projecting downwards from it. But though a little water has appeared above the cake when it was loosened from the sides, it has on the whole remained at the surface.

I have no explanation to offer, and in spite of the witness of members of the class and my own vivid recollection, now find some difficulty in believing that the ice really sank to the bottom. It is so difficult to see how the ice could be more dense than the supercooled water that I should be inclined rather to look for a clue in some effect of surface tension or the capillary attraction of the water rising through the spaces between the compacted mass of needles.

II.—*The Relation of Thermal Change to Tension and Compression Stress with an Account of some Experiments on Impulsive Stress.*

By E. G. COKER, M.A., D.Sc., F.R.S.E.,
Associate Professor of Civil Engineering,

And C. M. MCKERGOW, M.Sc.
Demonstrator of Civil Engineering, both of McGill University.

(Communicated by Prof. H. T. Bovey, and read June 22, 1904.)

The thermal effects of stress upon bodies appears to have been first studied by Weber,¹ who found that when an iron wire was suddenly stretched a thermal effect was produced, and that the thermal change was proportional to the stress. He further showed that metal wires when stretched are lowered in temperature, and when compressed the temperature is raised. Lord Kelvin² deduced the general equations of thermo-elasticity from the laws of thermo-dynamics, and proved that with stresses of the most general type the thermal effect is proportional to the applied stress, provided the material remains perfectly elastic. For simple tension and compression stress, to which this paper is limited, an expression for the thermal change may be very easily deduced as follows:—

If we consider a unit mass of rod of length l , subjected to a compression stress of intensity p , which shortens the bar by an amount dl , then if E be the initial intrinsic energy of the bar, and dH be the amount of heat developed by the compression, we have

$$\begin{aligned} dE + pdl &= JdH \\ &= J \left\{ \left(\frac{dH}{dt} \right) \dot{p} dt + \left(\frac{dH}{dp} \right) t dp \right\} \\ &= J \left\{ Kdt + Ldp \right\} \text{ say} \end{aligned}$$

from which we obtain by an easy application of the second law of thermodynamics

$$L = - \frac{t}{J} \cdot \frac{dl}{dt} = - \frac{t}{J} \alpha l$$

where α is the coefficient of expansion of the bar for unit increase of temperature.

¹ Poggendorff Annalen. Bd. XX, 1830.

² Collected papers. Vol I, p. 293.

If therefore the bar is suddenly compressed without gaining or losing heat, i.e., at constant entropy φ , we have

$$\text{or} \quad Kdt + Ldp = 0$$

$$\frac{dt}{dp_\varphi} = -\frac{L}{K} = \frac{\alpha l}{JK}$$

and therefore for small changes of pressure Δp and temperature Δt we can write the equation in the form

$$p = \Delta t \frac{JK}{t \alpha l}$$

For a tensional stress of amount ΔT , the sign will be negative, and hence if a compression stress applied to a bar raises the temperature, a tensional stress will lower it.

The direction of the change of temperature depends essentially on the sign of the coefficient of expansion since all the other values are positive. It therefore follows that the thermal change for a small increase of stress is linearly proportional to the stress, provided the other quantities entering into the equation remain constant. Of these it is possible that under some conditions of stress the value of the specific heat K of the bar may change under stress, but from the molecular theory of the constitution of matter, we may infer that if any change occurs it will probably be very small; again, the coefficient of expansion of metals may vary with the stress applied; we have found by experiment upon thin tubes of brass and steel that there is practically no alteration in the value of the coefficient of expansion for any stress within the yield point, and the coefficient is the same in the case of steel, even when the metal is stressed beyond the yield point, while for brass there appears to be a small increase.

The measurement of the small changes of temperature due to a change in the stress is easily accomplished by the use of a thermal junction or pile, and in this way Joule¹ verified the Thomson law stated above for various solids, including such materials as wrought iron, steel, cast iron, copper and various timbers, and this method has been applied by Edlund² to determine the behaviour of wires under stress. In a recent paper by Turner,³ the methods of Joule and Edlund are substantially followed in some interesting experiments on

¹ On some thermo-dynamical properties of solids. Transactions of the Royal Society, 1853.

² Poggendorff Annalen. Vols. 114 and 126, 1865.

³ Transactions of the American Society of Civil Engineers, 1902.

comparatively large tension bars, using a modern testing machine for loading the specimen.

The most convenient means of observing the change of temperature of a thermopile attached to a specimen under stress is a D'Arsonval galvanometer, the field of which is very uniform in the neighbourhood of large masses of feebly magnetized iron, such as are usually present in a testing laboratory, and if care is taken to prevent the short circuiting of the thermopile in contact with the specimen by a thin sheet of tissue paper, the changes in temperature due to the stress can be easily followed and comparative readings obtained. The readings are, however, not a faithful record unless certain precautions are observed, for the moving coil of a D'Arsonval galvanometer does not take up a new equilibrium position at once, on account of its inertia and the lag of the pile, and therefore any lag of this kind will cause an error in the observations. It is always possible, however, to time the rate of loading so that the reading of the galvanometer is a maximum for the stress at that instant, and, as an example of the ease with which this can be done, the following results may be quoted of a tension specimen 2.00 inches by 0.375 inches in section. The load was applied as uniformly as possible, commencing with an initial load of 500 pounds and ending with a load of 16,000 pounds. In this way the following observations were made:—

TABLE I.

LOAD POUNDS	TIME	GALVANOMETER READINGS		LOAD POUNDS	TIME	GALOT READING OBSERVED
		OBSERVED	CORRECTED $K = .00276$			
500	0	0	0	16,000	4'-25"	12.4
2,000	20"	0.8	.82	"	4'-40"	11.9
4,000	45"	2.8	2.97	"	4'-55"	11.4
6,000	1'-15"	4.9	5.41	"	5'-30"	10.4
8,000	1'-40"	6.8	7.74	"	6'-2"	9.2
10,000	2'-10"	8.6	10.14	"	6'-40"	8.4
12,000	2'-40"	10.3	12.80	"	7'-20"	7.4
14,000	3'-10"	11.8	14.86	"	8'-10"	6.4
16,000	3'-40"	13.1	17.10	"	9'-15"	5.4
"	4'-7"	12.9	16.62			

Resistance of pile = 5.55 ohms.

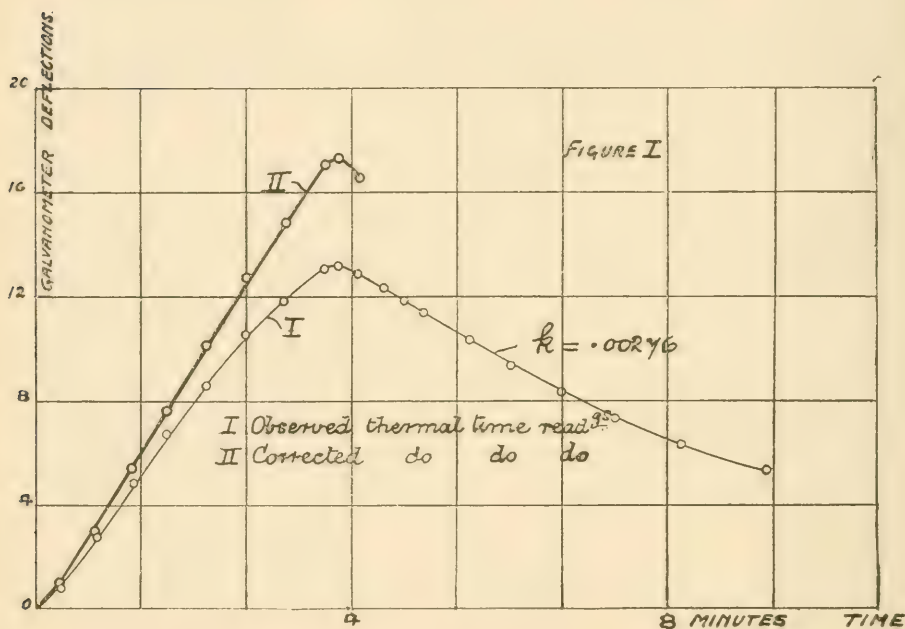
Resistance of galvanometer = 5.2 ohms.

Scale distance = 5'.10".

Resistance of leads = 0.52 ohms.

One division on scale = 0.5 inches.

The readings show that with this rate of loading the stress and thermal change reach a maximum at practically the same time, and then, owing to losses by conduction and radiation, the bar gradually warms up to the temperature of its surroundings. The deflections given in Table I are plotted in Figure 1 to a time basis, and it will be



noticed that the ascending part of the curve does not show a linear relation to the stress, but if allowance is made for the disturbing causes, the relation can easily be shown to be a linear one.

Since the effect of lag of the galvanometer may be regarded as eliminated by proper adjustment of the rate of loading, we may obtain a correction factor for the conduction and radiation in the following way.

Let θ_0 be the diminution of temperature per second due to the application of a stress increasing uniformly with the time, and let θ be the actual difference of temperature at any time from the commencement of the application of stress, then since there is a loss of heat, $\theta < \theta_0 t$ and this loss depends on the difference of temperature between the specimen and the surrounding bodies.

This loss can be very approximately determined by observations of the subsequent readings when the stress remains stationary, and it was

found in all cases that it was very closely proportional to the first power of the difference of temperature. In an interval of time dt therefore the diminution of temperature for a tension specimen under uniformly applied stress will be

$$\theta_o dt - k \theta dt$$

where k is some constant to be determined, the actual decrease of temperature in the time dt is $\frac{d\theta}{dt} dt$ hence

$$\frac{d\theta}{dt} dt = \theta_o dt - k \theta dt$$

$$\text{or } \frac{d\theta}{dt} + k\theta = \theta_o \quad (2)$$

An integrating factor of equation 2 is obviously e^{kt} therefore

$$e^{kt} \theta = \theta_o \int e^{kt} dt + c$$

$$= \theta_o e^{kt} / k + c$$

$$\text{or } \theta = \theta_o / k + c e^{-kt} \quad (3)$$

To determine the constant c we have the condition that θ is zero when $t = 0$ hence $c = -\theta_o / k$ and we have

$$\theta_o = k \theta / 1 - e^{-kt}$$

and if we neglect expressions involving k^2 , since k is always a small quantity, we easily arrive at a sufficiently approximate equation of the form

$$\theta_o t = \theta (1 + kt/2)$$

provided $t < 2/k$ the latter condition being necessary to ensure convergence in expanding $(1 - e^{-kt})^{-1}$

Now, $\theta_o t$ is the actual decrement of temperature D_A due to the stress up to the time t , and θ is the observed value D_o . Hence the actual observations must be corrected by adding thereto a quantity $D_o kt / 2$.

The value of k is easily determined in each case by the second part of the curve, which is found experimentally to be always of the exponential type, showing that the assumption of the loss being propor-

tional to the difference of temperature is correct. Hence at any points 1, 2, we shall have the relations

$$\begin{aligned} D_{o_1} &= C \varepsilon^{-kt_1} \\ D_{o_2} &= C \varepsilon^{-kt_2} \\ D_{o_1}/D_{o_2} &= \varepsilon^{-k(t_1-t_2)}. \end{aligned}$$

$$\text{or} \quad k = \log_e \frac{D_{o_1}}{D_{o_2}} (t_2 - t_1)$$

In the present example the value of k was found to be .00276, the time being measured in seconds, and the corrected curve is shown on Figure 1, from which it will be seen that the relation of thermal change to stress is a linear one, except at the commencement, where the inertia of the moving coil and the lag of the thermopile itself causes a disturbing influence. There are other corrections due to (1) the change in the resistance of the circuit owing to change in temperature, (2) the galvanometer deflections being proportional to $\varphi / \cos \varphi$ where φ is the angular displacement of the coil, and also due to (3) the scale being straight; of these (1) was negligible, as the temperature was very constant and about 68° Fahr., and in (2) and (3) the value of φ was rarely greater than 5°, so that all these latter corrections are negligible usually.

It has been supposed by Turner¹ that the relation between thermal change and stress does not follow the same law as the relation between stress and strain for the range of stress up to the yield point, but that there is a marked deviation from linearity for the thermal change long before the yield point is reached, and hence it is inferred that the elastic limit, as determined by thermal measurements, is much lower than if determined by strain measurements. If, however, due correction is made for the effects of conduction and radiation, it can be shown that this is not the case, and that both strain and thermal effect bear a linear relation to the stress for approximately the same range of stress.

In the case of the specimen mentioned above, this was tested by applying an extensometer of the Unwin type as well as a thermo-pile, and observing the readings of both simultaneously up to the yield point of the material. The experiment gave the following results:—

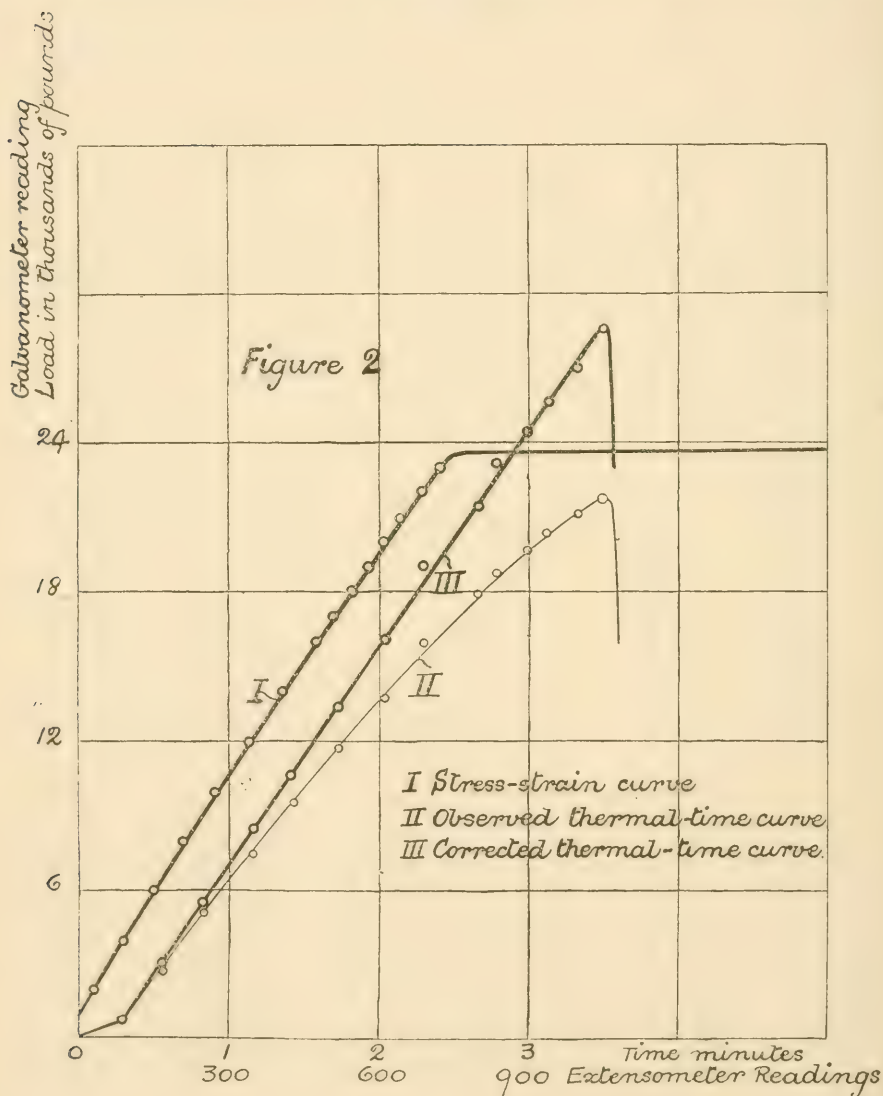
¹ Loc. cit ante.

TABLE II.

LOAD POUNDS	TIME SECONDS	EXTENSOMETER READINGS	GALVANOMETER READINGS.	
			OBSERVED	CORRECTED $K = .00266$
500	0	0 — 30	0	8
2,000	17	30 60	0.75	0.77
4,090	35	90 60	2.75	2.88
6,000	50	150 60	5.15	5.50
8,000	70	210 65	7.45	8.60
10,000	87	275 65	9.55	10.65
12,000	105	340 70	11.65	13.35
14,000	123	410 65	13.75	16.10
16,000	138	475 35	16.05	19.15
17,000	—	510 40	17.05	—
18,000	160	550 30	17.95	21.40
19,000	167	580 30	18.85	23.25
20,000	180	610 35	19.65	24.40
21,000	188	645 45	20.45	25.70
22,000	200	690 35	21.15	27.00
23,000	210	725	21.85	28.30
24,000	220	Went off scale Yield point	Went off scale in the opposite direction.	

The relation between strain and thermal change is apparently not a linear one, for the galvanometer readings are not proportional to the load; this is seen very clearly in Fig. 2, where the stress strain curve I is very approximately linear up to a stress of 23,000 pounds applied uniformly in 210 seconds. If, however, the curve II, showing the thermal change, be corrected for radiation and conduction, the resulting curve III gives a linear relation for approximately the same range of stress. In the actual observations a marked heating effect was noticed about two seconds before the yield point was reached, corresponding to a small difference of about 200 pounds of stress. It was therefore inferred that the thermal change and strain are proportional to the stress through about the same range. Other tension experiments confirmed this inference.

The relation of thermal change to compression stress and to strain was determined in precisely the same manner as in the case of the tension experiments, except that a strain measuring instrument of the



Ewing type was employed as being more convenient. Its calibration value was one unit= $1/250,000$ of an inch, and before using it was re-calibrated, using a Whitworth measuring machine as a standard.

As an example of a compression test, the case of a wrought iron specimen of square section and one inch side may be quoted. This specimen was $4\frac{3}{4}$ inches long, just sufficient to accommodate the thermopile and strain measuring instrument. Preliminary experiments showed that the value of k under the given conditions was $\cdot 00985$; the curve I from which the value was obtained is plotted on Figure 3.

In the final test, beyond the yield point, the readings obtained were as follows:—

TABLE III.

TIME SECONDS.	LOAD POUNDS.	EXTENSOMETER READINGS.	GALVANOMETER READING.		
			TIME SECONDS.	OBSERVED READINGS.	CORRECTED READINGS. $K = \cdot 00985$.
0	1,000	0	0	0	0
12	5,000	46	10	2.0	2.01
..	9,000	...	20	5.5	6.05
32	13,000	129	30	8.5	9.8
..	19,000	186	40	11.2	13.4
55	23,000	236	50	13.8	17.2
65	27,000	286	60	16.4	21.5
70	29,000	—	70	19.1	25.8
79	30,000	yield point.	80	44.0	61.5
			went off scale.		

Resistance of pile = 5.55 ohms.

Resistance of galvanometer = 5.2 ohms.

Resistance of leads = 1.81 ohms.

Scale distance = $10''.0\frac{1}{2}''$.

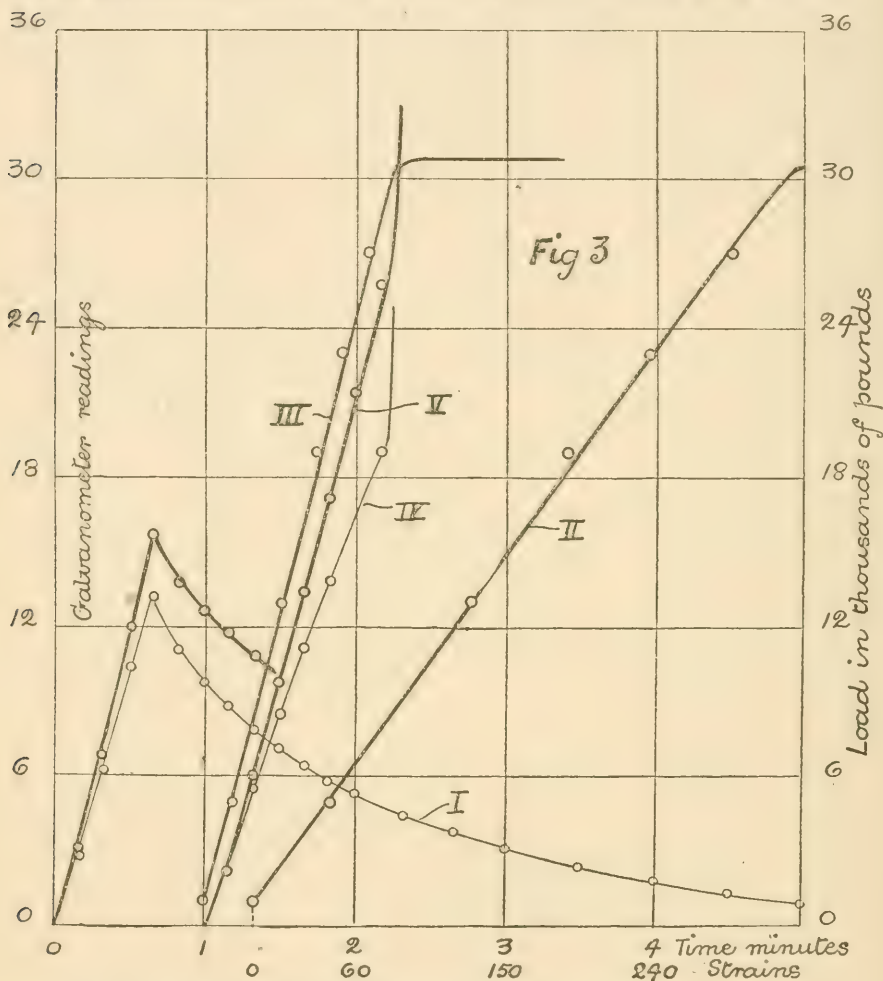
One division on scale = 0.5 inches.

These results show that the yield point, as determined by strain measurements, coincides with the point where the thermal change shows a marked deviation from linearity.

The thermal change is, moreover, proportional to the stress up to this point, and this is clearly indicated in Figure 3, where the thermal time curve IV is plotted from the observed readings, and from this curve V has been derived, giving a linear relation to near the yield point, like the stress-strain relation curve III.

Similar experiments upon other compression members confirmed these results, and hence it appears that the thermal change for both

tension and compression is proportional to the applied stress, and there is no appreciable departure therefrom up to or near the yield point.



I Conduction and radiation loss curve

II Stress-strain curve.

III Stress-time curve

IV Observed thermal-time curve.

V Corrected thermal-time curve.

The microscopic investigations of Mugge,¹ Ewing and Rosenhain² and others also strengthen this view, for they have shown that until the

¹ Mugge "Ueber neue Structurflächen an den Krystallen der gediegen Metalle." Nachricht. der k. Gessell. der Wissen zu Göttingen; Mathphysc. Klasse, *899: Heft I.

² Ewing and Rosenhain "The crystalline structure of Metals." Bakerian Lecture, Transaction Royal Society, 1900.

yield point is reached no visible change takes place in the structure of the crystalline aggregate, but as soon as the stress is increased beyond this, slip bands appear and continue to grow in number as the stress is intensified. There seems no reason to doubt that the large heating effect produced in plastic strain is due to the production of these slip bands, and that in their absence we may expect the Thomson law to hold.

From the experiments of Joule it appears that the thermal stress relation may be expected to hold generally for elastic bodies, and this is well shown in some experiments on the compression of a short column of cement, which had been kept in the McGill University testing laboratory for more than ten years. Specimens recently made show little or no sign of elastic properties, but in specimens of great age, the cement appears to exhibit approximately perfect elasticity to near the crushing load.

The laboratory record book showed that the specimen examined was made from "Peters'" brand of cement on November 10th, 1893, and the average tensile strength of the neat cement at the end of 28 days was 220 pounds, and the compression strength was 1,600 pounds; the tests for fineness, soundness and blowing tests were stated to be satisfactory. The specimen originally formed part of a bar, one inch square and nine inches long, which broke with a central load of 54 pounds at the end of a week; a similar specimen, at the end of four weeks, broke with a load of 84 pounds. This specimen was cut down to 2.5 inches, and faced in a lathe, and was then subjected to stress in a small press provided with an accurately calibrated hydraulic diaphragm for measuring the stress. Several experiments were made at different loads, and finally the specimen was stressed until fracture took place. In this way the following readings were obtained:—

TABLE IV.

	GALVANOMETER READINGS.											
Loads Pounds	100-2000 lbs in 10 secs.		100-4000 lbs in 20 secs.		100-6000 lbs in 30 secs.		100-8000 lbs. in 80 seconds		100-10,000 lbs. in 105 secs.		100 lbs. to fracture (11,800 lbs.)	
Time Seconds	correct. obs ^{vd} . k = .0032		obs ^{vd} . correct. k = .0031		obs ^{vd} . correct. k = .00295		obs ^{vd} . correct. k = .0031		obs ^{vd} . correct. k = .0029		Obs ^{va} . correct. k = .003	
0	0	0	0	0	0	0	0	0	0	0	0	0
10	1.0	1.02	1.20	1.22	1.95	1.98	0.45	0.46	0.60	0.61	0.30	0.31
20	2.3	2.34	2.90	3.00	4.00	4.12	1.50	1.55	2.00	2.06	1.50	1.55
30	2.6	2.72	5.20	5.45	6.50	6.80	3.05	3.20	3.40	3.55	3.20	3.34
40	2.6	2.76	5.50	5.85	8.10	8.60	4.50	4.76	4.80	5.10	4.40	4.66
50	2.5	2.69	5.35	3.75	8.40	9.03	5.90	6.35	6.30	6.78	5.70	6.13
60	2.4	2.62	—	—	8.32	9.05	7.50	8.20	7.50	8.18	7.10	7.74
70	—	—	—	—	—	—	8.90	9.85	8.80	9.75	8.60	9.50
80	—	—	—	—	—	—	10.00	11.20	10.10	11.30	10.00	11.20
90	2.2	2.5	4.75	—	—	—	10.75	12.20	11.40	12.95	11.50	13.05
100	—	—	—	—	—	—	10.80	12.40	12.70	14.61	12.30	11.15
110	—	—	—	—	—	—	—	—	13.40	15.61	13.60	15.84
120	1.98	2.33	4.30	—	6.90	—	10.20	12.04	13.40	15.81	specimen broke 118 seconds from commence- ment of test.	
150	—	—	—	—	6.25	—	9.25	—	12.20	—		
180	1.50	—	3.60	—	5.75	—	8.40	—	11.10	—		
240	1.10	—	3.00	—	4.90	—	7.00	—	9.40	—		
300	0.90	—	2.50	—	4.05	—	5.80	—	7.90	—		
360	0.82	—	2.10	—	—	—	4.95	—	6.65	—		

Resistance of pile = 5.55 ohms.

Resistance of leads = 1.81 ohms.

Resistance of galvanometer = 5.2 ohms.

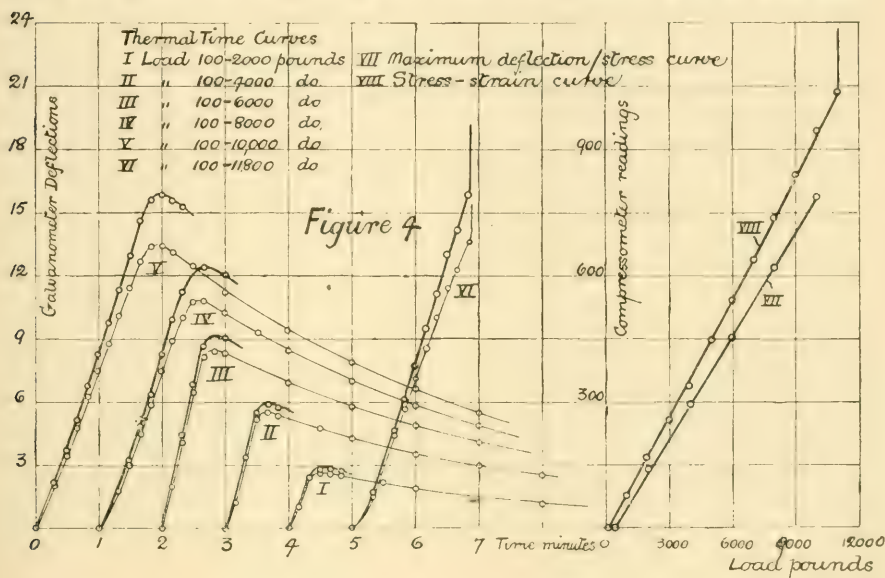
Scale distance = 9'.103"

One division = 0.5".

TABLE V

LOAD POUNDS	READING 1 division $\frac{1}{2500000}$ "		LOAD POUNDS	READING 1 division $\frac{1}{2500000}$ "	
100	0	— 80	6,000	540	— 100
1,000	80	— 90	7,000	640	— 100
2,000	170	— 90	8,000	740	— 100
3,000	260	— 95	9,000	840	— 105
4,000	335	— 95	10,000	945	— 139
5,000	450		11,000	1084	

In the first three experiments the load was applied at the rate of 20,000 pounds in 10 seconds, while in the last three the rate was one-half this, as the former rate of loading caused some lag in the readings. In all cases the value of k was approximately .003, and this value was used for obtaining the true reading. The specimen finally broke at a stress of 11,800 pounds per square inch. All the results of Table IV. are plotted on Figure 4, and from this figure it will be seen that



the cement behaved as an approximately elastic solid, for the thermal stress curves, when corrected, are nearly straight lines, and, moreover, their maximum ordinates are proportional to the stress; this is more clearly seen in the Figure curve VII, where the maximum ordinates are plotted with reference to the loads, and the resulting curves give a straight line very nearly.

The other half of the same bar was subsequently used for obtaining a stress-strain curve. The observations are given in Table V., and the stress strain curve is plotted Curve VIII to compare with the corrected thermal load curve obtained previously, and the linear relation is very apparent.

IMPULSIVE STRESS

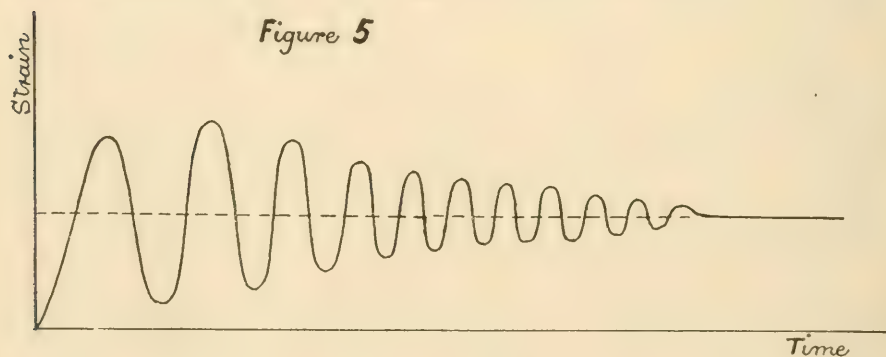
It is a matter of common observation that if a tension member be suddenly loaded in a testing machine, the readings of an extensometer applied to the test piece will fluctuate between wide limits, owing to

the impulsive loading, and in machines of the Buckton type, having a beam weighing several thousands of pounds, the stress imposed may be more than doubled owing to the inertia of the beam. Thus in a test of a tension bar having a section of 2.08 by 0.4 inches, with an extensometer of the Märtens type attached, the following readings were obtained when the length under test was 8 inches and the times of application were estimated by stop-watch:—

TABLE VI.

EXPERIMENT	MAXIMUM READING	STEADY READING	TIME OF APPLICATION SECONDS
1	31.0	18.3	4
2	35.0	18.2	3
3	36.0	18.2	2
4	40.0	18.2	1.5
5	49.0	18.4	Very suddenly

The observations made showed that the strain varied after the manner shown in Figure 5, the second vibration being almost invariably the greatest. If, however, a compression piece is set in an



hydraulic press, and a load is applied as quickly as possible, no such vibration appears, and the strain does not appear to differ from that obtained when the load is applied gradually.

In order to determine if thermal measurements will detect an increase of stress due to an impulsive load, a number of experiments were made on tension and compression specimens.

In order to compare results for different times of application of the load, it is easily seen that the correction factor to be applied for

radiation and conduction will vary, for if an instantaneous load be applied to a bar producing a thermal change of θ_0 , then if k be the heat loss in unit time due to unit temperature difference, then we have, using our previous notation—

$$d\theta = -k\theta dt$$

$$\text{or } \frac{d\theta}{\theta} = -k \cdot dt$$

and hence the temperature at any subsequent time is

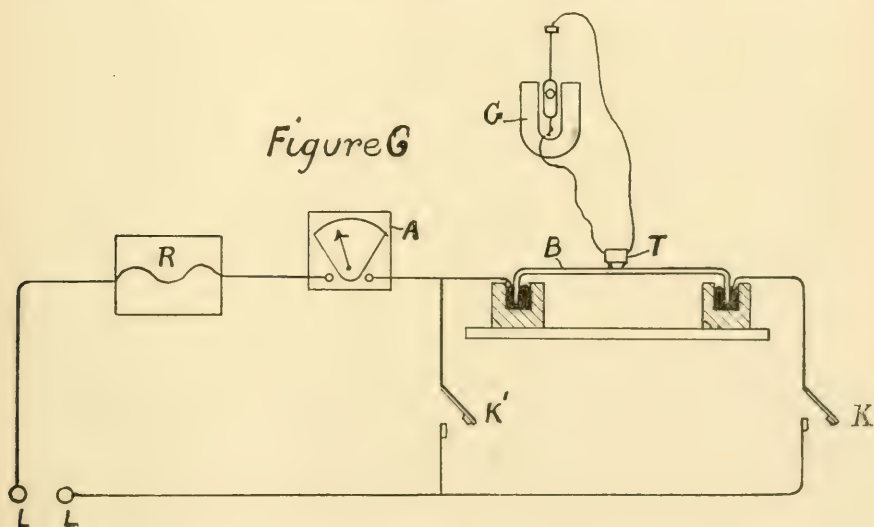
$$\theta = \theta_0 e^{-kt}$$

or if we neglect quantities involving k^2 , we arrive at a correction formula of the form

$$D_a = D_0 (1 + kt)$$

or the correction is twice that found for a gradually applied load.

In order to test the approximate correctness of the above formula for such cases, some preliminary experiments were made, in which a definite heating effect was applied to a test piece for different intervals of time. Figure 6 shows the arrangement used, where the ends of a



thin strip of steel B are joined up in a circuit containing an adjustable resistance R , and an ammeter A . A thermo-pile T pressed against the

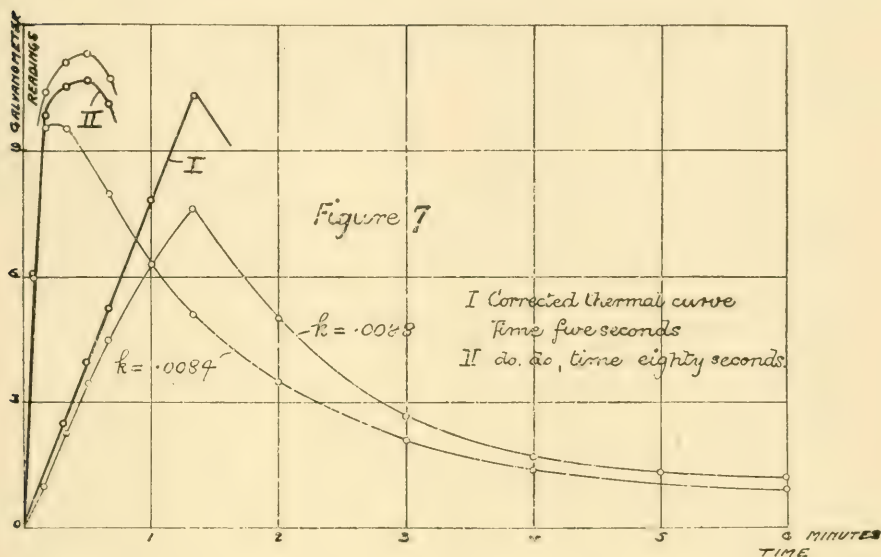
strip was connected to a galvanometer G, and a current of known intensity was allowed to flow through the test piece for a time corresponding to the time occupied in a gradual load test, and the deflections obtained were compared with those from a similar experiment when a heavy current was used for a short interval of time. The heating effect varies as I^2Rt , where I is the current, R the resistance and t the time, and the experiments were adjusted so that the same heating effect was produced as nearly as possible whatever the time might be. A number of experiments were made, of which the following set may be taken as a type:—

TABLE VII.

Time Seconds	Amperes = 14.4. Time = 5 seconds.			Amperes = 3.5 Time = 80 seconds	
	GALVANOMETER READINGS.			GALVANOMETER READINGS	
	Observed	Corrected $k = .0084$	Corrected to 14 amperes	Observed	Corrected $k = .0088$
0	0	0	0	0	0
5	6.0	6.25	5.91	—	—
10	9.6	10.40	9.83	1.0	1.04
20	9.5	11.10	10.50	2.3	2.50
30	9.0	11.30	10.68	3.5	3.96
40	8.0	10.70	10.11	4.5	5.29
60	6.3			6.2	7.83
80	5.1			7.7	10.40
120	3.5			5.0	—
240	1.4			1.7	—
360	0.9			1.2	—

The times were taken by a stop-watch, and the values of k were found in the usual manner, and due correction is made for the excess of current in the first experiment. The maximum corrected value for the first experiment is about three per cent greater than the corresponding value for the second one, and this difference appears to be partly due to the experimental difficulty of making and breaking the circuit accurately in such a short period of time, when a stop-watch is used, and also due to the fact that the correction factor $D_a = D_o (1 + ckt)$

where $c = 1$ is slightly too great, since in obtaining it we assume an instantaneous loading.



If it be assumed that the value of c is linearly proportional to the time, then, since it is unity and one-half in the extreme cases, the value of c in the present case would be 0.94.

We have, however, preferred to retain the value unity, since the assumption of a linear law may not be warranted. It is, however, worthy of note that if the value, 0.94, be used for the correction factor, the maximum value in the first experiment becomes 10.47, as compared with 10.14 in the second experiment. In all these experiments we found the differences were never greater than four per cent.

We may assume therefore that any impulsive load effect which shows a greater difference than this, as compared with a steady loading, is not due to the correction factors employed. Although a number of experiments were made on both tension and compression members, it will be sufficient to quote one or two in order to indicate the general character of the results.

In an experiment upon a steel tension specimen, 2.00 by 0.38 inches in section, the load was first applied gradually, and then very quickly. The data obtained are shown in Table VIII., and this show that with the gradual loading the maximum corrected value of the deflections was 9.24; when, however, the same loading was effected in four seconds,

the correct reading was 9.27. Thus both readings are practically identical, and the increased stress produced by the manner of loading appears to have no influence on the deflection of the galvanometer.

TABLE VIII.

Load Pounds	Time	GALV'R READING		Load 500 8000 in 4 seconds		
				Time	GALV'R READING	
		Observed	Corrected $k = .0029$		Observed	Corrected $k = .0029$
500	0"	0	0	0"	0	0
2000	15"	0.95	0.97	10"	5.2	5.35
4000	40"	2.90	3.07	15"	6.2	6.47
6000	60"	5.10	5.54	20"	6.9	7.30
8000	1'.25"	7.30	8.20	30"	7.7	8.37
	1'.36"	7.90	9.00	35"	7.9	8.71
	1'.57"	7.90	9.24	40"	7.95	8.87
	2'.15"	7.60	9.09	45"	8.00	9.04
	2'.40"	7.10	8.75	50"	8.00	9.16
	3'.30"	6.10	—	55"	7.95	9.22
	4'.30"	5.10	—	1'.00"	7.90	9.27
	5'.40"	4.10	—	1'.30"	7.25	9.15
	7'.26"	3.10	—	2'.00"	6.65	—
				2'.30"	6.00	—
				3'.00"	5.60	—

Resistance of thermo-pile = 5.55 ohms.

Resistance of galvanometer = 5 ohms.

Resistance of leads = 0.52 ohms.

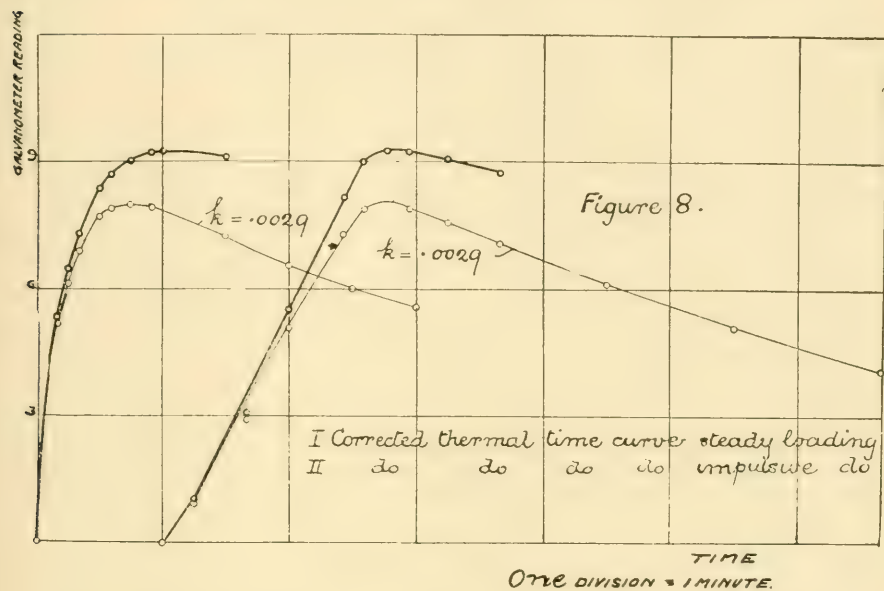
Scale of distance = 5'.10".

One division on scale = 0.5.

The readings obtained are plotted in Figure 8, and show no trace of the vibration stress.

The same bar was loaded from 500-16,000 pounds (a) gradually, (b) in 4 seconds; the corrected readings were 18.25 and 18.4 respectively, and the plotted curves were perfectly regular as before.

It seems therefore that thermal changes, such as take place with suddenly applied loads, are far too rapid to be detected by an ordinary thermo-pile, only the mean integral effect being registered, and there-



fore such a method of measurement requires considerable improvement to become applicable for the determination of the effects of stress in bridges and machines subjected to rapidly varying loads

III.—*Researches in Physical Chemistry, carried out in the University of Toronto during the Past Year.*

Communicated by PROF. W. LASH MILLER.

(Read June 23, 1904.)

1. *The Chromates of Bismuth:—Dr. F. B. Allan.* A study of the reactions between chromic acid and bismuth salts from the standpoint of the phase rule has led not only to a correct enumeration and description of the various basic and acid chromates, but to the discovery of cases of false equilibrium, which are of great interest from the theoretical point of view.

2. *The Rates of the Reactions in solutions containing Potassium iodide, Arsenious acid, and Chromic acid:—Mr. Ralph E. DeLury.* The rate at which iodine is liberated in solutions containing potassium iodide and chromic acid has already been studied by Mr. DeLury (Trans. Roy. Soc. Canada, IX., 49). Addition of arsenious acid much increases the rate, and the present investigation has been undertaken in order to study this case of catalysis in detail.

The experiments show that the rate of oxidation of arsenious acid by chromic acid is proportional to the concentration of the bichromate, to that of the arsenite, and to the 1.6th power of the concentration of the acid, whether potassium iodide be present or not. Addition of potassium iodide somewhat retards the rate at which arsenic acid is formed, while in the presence of arsenious acid the liberation of iodine is almost independent of the concentration of the iodide, if the latter be greater than a certain low value.

The results of the investigation lead to the hypothesis that the primary product of oxidation of arsenious acid by chromic acid is a peroxide, As_2O_7 , which is then reduced to As_2O_3 by the action of arsenious acid or potassium iodide. Although it has long been customary to explain cases of catalytic action such as the above by the assumption of peroxides, this is the first case in which the hypothesis has been borne out by direct measurements of the rates of the reactions involved; the only other reaction studied from this point of view is that between chromic acid, potassium iodide, and ferrous sulphate (Miss Benson, *these Transactions*, IX., 49), in which the results of the measurements are in direct opposition to the peroxide hypothesis.

3. *The Rate of the Reaction between Hydrogen iodide and Iodic acids:—Mr. Saul Dushman.* In the present investigation Mr. Dushman adopted a modification of a method which was originally employed

in 1866 by Messrs. Harcourt and Esson in their classical researches on the rates of chemical change. His experiments lead to very simple results, viz:— that the rate of the reaction is proportional to the concentration of the IO_3 to the square of the concentration of the H , and to the 1·8th or 1·9th power of that of the I , while the I_2 exerts an accelerating influence, which was studied in detail. By means of the differential equation embodying these relations the course of the reaction can be satisfactorily reproduced.

Apart from their intrinsic interest, these results are of value as showing the power of Harcourt and Esson's method in the study of Chemical Kinetics. As recently as 1898, in a paper "On the Reduction of Bromic Acid and the Law of Mass Action," the authors, Messrs. Judson and Walker, expressed themselves as follows:—"It is evident, therefore, that the action of hydrogen iodide on the oxygen acids of the halogens is of too intricate a nature to give any satisfactory numerical results." The rate of this "intricate reaction" is now known as a simple function of the concentration of the reagents involved.

4. *The Reaction between Bromine and p-Nitro-phenol*:—Mr. E. L. C. Forster. Experiments undertaken in connection with an extended physico-chemical study of the action of nitric acid on phenol. Bromine water and p-nitro-phenol give di-brom-nitro-phenol, which is then converted in part into a derivative analogous to Benedikt's tribrom-phenolbromide. By operating in acid solution the formation of the latter substance can be avoided.

5. *The Electrolysis of Acid Solutions of Aniline*:—Mr. Lachlan Gilchrist. These experiments were begun in the hope of finding an easy laboratory method of preparing the chlor-anilines by electrolysis of solutions of aniline in hydrochloric acid. It was soon found, however, that the formation of aniline-black at the anode could not be avoided; and though at first this was thought to be the product of some secondary reaction, determination of the decomposition-voltage of solutions of aniline in hydrochloric and sulphuric acids made it apparent that the dye-stuff is the primary product of electrolysis.

As the voltage at which aniline-black appears in decinormal acid is 0·95 volt (against the hydrogen electrode), while chlorine is liberated at 1·25 volts, it seemed unlikely that more than a trace of the chlor-anilines could be prepared by electrolysis. This conclusion was confirmed by experiments on a large scale, where the products of electrolysis were systematically examined. Tribrom-aniline, on the other hand, is easily prepared by electrolysis in hydrobromic acid solutions; this result is in accordance with the lower decomposition-voltage of hydrobromic acid.

Finally, the oxidation-potential of meta-nitraniline in decinormal sulphuric acid was determined, and found to be 1.43 volts.

6. *A Mechanical Model to illustrate the Gas Laws*:—Dr. Frank B. Kenrick. The difficulty of getting elementary students to grasp the fundamental ideas of the gas laws confronts every teacher of physical chemistry. The model, which has been in use for a year in the chemical laboratory of the University of Toronto, works admirably, not only in giving students definite conceptions of Carnot's cycle, etc., but also in awakening their interest in, and aiding them to grasp the essential idea of the calculus. (Described in Jour. Phys. Chem. VIII., 351).

7. *The Determination of Phenol; and the Detection, Estimation, and Rate of Formation of Tri-brom-phenol-bromide*:—Mr. S. J. Lloyd. It is first shown that the liberation of iodine from hydriodic acid by tribromphenol-bromide is not quantitative, from which it follows that the formation of the bromide in the determination of phenol by bromine vitiates the results of the analysis. The conditions under which the bromide is formed are then taken up, and means of obviating its occurrence discovered; in this connection a solution of benzidine in chloroform was found to serve as a delicate qualitative reagent for tribromphenol-bromide, and a method for estimating it quantitatively was worked out.

Experiments on the evaporation of bromine during the analysis, and on the action of bromic acid on phenol complete the investigation, which results in formulating the conditions under which phenol can be determined with an accuracy of 1 to 2 parts per thousand.

8. *The Electrolytic Migration in solutions of the weak acids*:—Mr. J. W. McBain. Continuing his work of last year, with the assistance of a grant from the Carnegie Institution of Washington, Mr. McBain has determined the migration in $n/2$, $n/10$, and $n/50$ acetic acid in $n/10$ propionic acid, and in mixtures of acetic acid with sodium acetate and with hydrochloric acid. He has also studied the motion of acetone in solutions containing water, acetone and cadmium sulphate.

9. *An apparatus for the quantitative study of the action of chemicals on Bacteria at constant temperature*:—Prof. W. Lash Miller and Prof. J. J. MacKenzie. The experiments described last year (*these Transactions*, IX., 51) are being continued with improved apparatus, by means of which the phenol solutions can be inoculated and samples removed (to count the bacteria) without removing them from the

IV.—*On the Artificial Production of Frazil Ice, together with Measurements of the Temperature Conditions in the Water.*

By HOWARD T. BARNES, D.Sc., Assistant Professor of Physics,
McGill University.

(Read June 23, 1904.)

In the last communication¹ which the author made to this Society on the subject of river ice formation, it was suggested that the temperature of a mixture of ice and water was constant only where there was neither a gain nor loss of heat. A diagram was shown to illustrate the way in which the temperature possibly varied. Starting with water at the freezing point, free from ice, an abstraction of heat causes a fall of temperature. As ice forms the temperature depression decreases, the rate of abstraction of heat remaining constant. When the quantity of ice becomes large the temperature falls again. Conversely, starting with ice melting, the temperature rises above the freezing point, falls again as the ice disappears, and then rises when the amount of ice becomes small compared with the water.

It was pointed out in support of this view that the temperature measurements made on the St. Lawrence river by the author gave an indication of the size of these deviations from the fixed point. These differences were found to be of the order of a few thousandths of a degree centigrade during the winter, when a considerable proportion of ice was present in the water. It was stated in the paper before referred to that experiments were to be made in the laboratory to verify these measurements. Greater difficulty was encountered in arranging the conditions than was first anticipated. This arose chiefly from the want of any suitable means of rapidly abstracting heat from the water, at a constant rate, and, at the same time, have the ice that was formed produced in fine needle crystals resembling in all respects the actual river conditions. On account of the minute temperature differences to be measured, great care had to be exercised in maintaining the purity of the water and providing for efficient stirring.

The obvious way was to pass a stream of cold air rapidly through the water, but no method of precooling the blast proved effective. On the introduction of the Hampson-Linde liquid air plant in the laboratory, however, a method at once suggested itself, and was put into successful operation during the past winter.

¹ Trans. Roy. Soc. Can., 1896, 1897 and 1899.

Liquid air, enclosed in a suitable vessel, was made to boil vigorously, and the cooled air led directly by suitable tubes into the water, and allowed to bubble through. The water experimented with was enclosed in a glass vessel immersed in a freezing-point mixture of snow and water, and cooled to zero. The liquid air was placed in another vessel, through the bottom of which two glass tubes protruded. These tubes passed from the space above the liquid air to the water below. The chilled air was thus conveyed as directly as possible into the water. In addition to the stirring produced by the rapid bubbling, a glass stirrer was provided. The obvious advantages of this method over any means of external cooling is that the ice that is formed is of the fine needle variety, exactly similar in appearance to frazil, instead of a cake of ice that, by the external method, would be formed around the sides of the vessel. Some difficulty was encountered in the freezing of water in the tubes conveying the chilled air, but with a strong blast this was of small amount. In order to measure the small difference of temperature between the water in which ice was being formed, and a uniform mixture of snow and water so protected as to be neither gaining nor losing heat, a pair of differential platinum thermometers was used, having a scale on a suitable resistance box of ten centimetres to a degree centigrade. With a vernier it was possible to set the contact piece to $1/100$ of a millimetre, and observe the deflections on a highly sensitive galvanometer. It was therefore possible to measure to the $1/10,000$ of a degree with comparative ease, and a difference of $1/100$ produced a large deflection. The differences which it was expected would be observed were of the order of a few thousandths; it was therefore necessary to pay particular attention to the readings. The method of carrying out an experiment was such that direct observation of the difference was obtained. One reading was made with the two thermometers in the snow mixture, and the second reading with one thermometer in the snow mixture and the other in the water.

It was possible to obtain at once a check of the ice point, by stopping the flow of chilled air, when the temperature of the water immediately rose to the zero point. In all cases this reading corresponded with the reading when both thermometers were together in the snow mixture.

Preliminary measurements were made with a Beckmann thermometer graduated to hundredths and reading to thousandths. At the outset, when the first ice crystals were forming, the temperature sank over a hundredth below freezing, which was measurable, but when larger quantities of ice crystals were present the instrument was not sensitive enough.

An effort was made to obtain readings for definite quantities of frazil ice. It was impossible to form an estimate of the quantity of ice formed by the chilled air, but clean dry snow was weighed outside the building, and added to a known weight of water. In our two series of tests, one set with the Beckmann and the other set with the platinum thermometers, we used different weights of water. The differences observed were practically the same in the two cases. The rate at which the chilled air was passed through was also the same. The differences observed were in practical agreement with the measurements made during the severe weather in the open water in the Lachine Rapids.

It was found that with the Beckmann thermometer the temperature of the water just at the time when the first ice crystals were formed was of the order of a hundredth of a degree. On adding successively 5, 10 and 20 parts by weight of ice the difference was reduced. This showed us that with very rapid cooling the temperature of the water never fell much below the freezing point. After repeating our experiments several times, we replaced the mercury thermometer with the differential platinum thermometers, and used a larger supply of water, about 400 cc. The readings we obtained are as follows:—

Ice just forming	—0140° C.
Ice 20%	—0060° C.

These measurements were checked several times, and all the conditions of the experiment were such as to warrant entire confidence in the results.

During the time in which the water was in this undercooled state, the fine needle crystals exhibited very completely the phenomenon of agglomeration. They appeared to be in a very adherent state, as shown by the formation of spongy masses and the accumulation about the thermometer bulb and stirrer. They adhered, of course, to the tubes leading in the chilled air, but not to the wall of the vessel, which was surrounded by the snow and water, and could not have been therefore far from 0°.

On withdrawing the vessel and examining the ice formed, it was found to resemble very closely the natural frazil crystals from the river. It was in a flocculent state, floating low in the water, easily kept under by the light masses at the surface.

It is possible to draw valuable conclusions from these experiments in regard to natural temperature conditions in the water. Since the maximum temperature depression in the severest weather is not likely to be more than a hundredth of a degree Fahrenheit when the frazil ice is in

the process of agglomeration, some suitable device for warming the water just at the point where it is desired to temper the effects of the ice could be applied with success. The ice itself is harmless to machinery, provided it is at the freezing point. By bringing the surrounding water to the freezing point, it is probable that little trouble would be met with.

V.—The Growth of the Ice Crystal in the Bunsen Ice Calorimeter.

By H. T. BARNES, D. Sc., Assistant Professor of Physics,

AND

A. S. B. LUCAS, B. Sc., Demonstrator of Physics, McGill University.

(Read June 23, 1904.)

Various attempts have been made to obviate the slow change in reading that occurs when using the Bunsen ice calorimeter for accurate work. Under ordinary conditions this change is an increase showing that the volume of the ice is increasing. C. V. Boys, in carefully studying the Bunsen ice calorimeter, attributed this increase to the fact that the ice mixture in which the calorimeter was immersed was slightly below the freezing point of the water in the calorimeter. This lower temperature, he said, was due to the minute quantity of saline matter in the ice he used for the mixture. In order to rectify this slow freezing he placed the calorimeter in an air chamber and surrounded the whole with ice. He thus balanced the freezing by a steady melting and was thus able to carry out his measurements. Mond, Ramsay and Shields encountered the same difficulty, and in their investigations where they employed the Bunsen ice calorimeter they follow the method described by Boys.

The capillary tube used in the apparatus of Boys had a volume of .0001288 c.c. per millimetre, and under the most favourable circumstances the thread of mercury dropped 1 mm. in three hours, while at other times it fell 4 mm. per hour.

Mond, Ramsay and Shields worked with a capillary tube having a volume of .0001196 c.c. per millimetre, and the average fall, following exactly Boys' arrangement, was from 1 to 2 mm. per hour.

In the experiments carried out by us an attempt was made to obtain steady readings with the ice calorimeter by paying particular attention to the purity of the ice mixtures. If the final conclusion arrived at by Boys is correct and the normal increase in reading, when the calorimeter is directly immersed in the freezing-point mixture, is due to saline matter in the water then by paying particular attention to the purity of the mixture it should be possible to overcome the slow process of freezing in the ice mantle.

From our experience with the use of freezing point mixtures made from Montreal water and pure freshly fallen snow or clean river ice for accurate temperature measurements, it seemed impossible that a divergence of as much as 1-1000 of a degree could exist. It is probable that the divergence from absolutely pure water and ice is very much less than this judging by the order of agreement attained in the calibration of very sensitive platinum thermometers.

Calibrations have been carried out in this laboratory repeatedly using fresh snow and river water, which have agreed to very much better than 1-1000 of a degree. We considered that a mixture prepared with great care from these materials would not differ from the absolute zero point on the centigrade scale by more than a few ten thousandths of a degree. The primary reason for this investigation was not to study

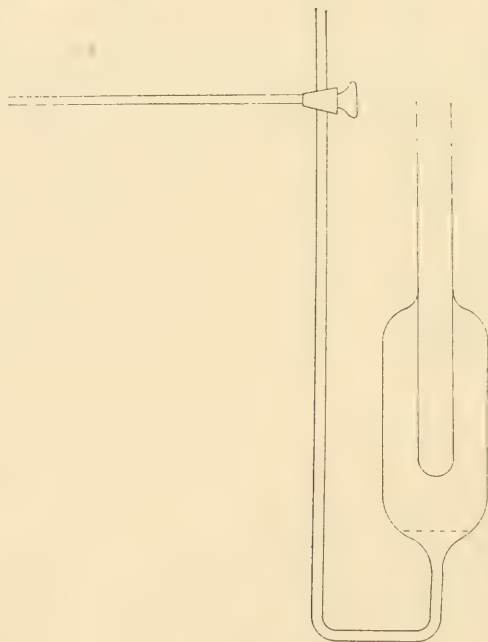


FIG. 1

the real cause of the gradual increase in the volume of ice, but to study the variation in the density of ice mantles prepared by different means. When we came to work with the ice calorimeter we found the increase in reading was so rapid that we were obliged to undertake a study of this point before going further. It was quite impossible to arrive at any conclusions in the point we had in mind before we had become thoroughly conversant with this peculiar phenomenon.

The form of calorimeter we employed is the usual one, and shown in Fig. 1. The bulb was filled with boiled distilled water, and subsequently closed with pure freshly distilled mercury. The expansion of the mercury took place along a horizontal capillary tube fitted to a three-way tap, so that the thread could be brought to any convenient point on an attached scale.

The capillary tube was 35 cm. long and had a volume of .0006619 c.c. per millimetre. The height of the capillary tube above the water was 35 cm. Thus the water in the calorimeter was under a pressure of little less than one-half an atmosphere which lowered the freezing point appreciably below the surrounding mixture. Even allowing a temperature in the mixture from impurity of as much as 1-1000 of a degree below freezing, the water in the calorimeter would still lie over 2-1000 lower than that. It seemed impossible to conceive of any progressive freezing going on in the ice mantle from the fact that the ice mixture was below the water in the calorimeter.

A large copper vessel was used to hold the freezing-point mixture, which was very carefully scoured and was perfectly clean.

The calorimeter could be completely buried up to the three-way tap in the mixture. The top and sides of the vessel were lagged heavily with thick felt and cotton wool. The whole apparatus was kept in a room at about 10° C. so as to preserve the mixture as long as possible. As the observations extended over several days the mixture was repaired at intervals of every few days with fresh snow or cracked ice. Four sets of experiments were made, which agreed very well. In one set, clean freshly fallen snow was selected and moistened with river water, and in the other sets clean cracked ice was used and moistened with distilled water or river water. The ice mantle was prepared in two cases by pouring into the inside tube a little liquid air after bringing the water in the calorimeter to the freezing point. In two cases a mild refrigerant was used in the shape of a salt mixture.

In all four sets a rapid increase of reading set in which persisted for the entire time of observations.

One of the sets obtained with a mantle frozen by means of salt and snow comes between the first and third set where liquid air was used. The fourth set was the same as the second, and did not extend more than a few hours, and is not therefore recorded here.

First Experiment.

A mantle about 8 m.m. in thickness was formed with liquid air and the calorimeter was then packed in a mixture of pure snow and water.

A slight rise of the mercury in the capillary was immediately noticed and this continued steadily for three days and a half. The rate of

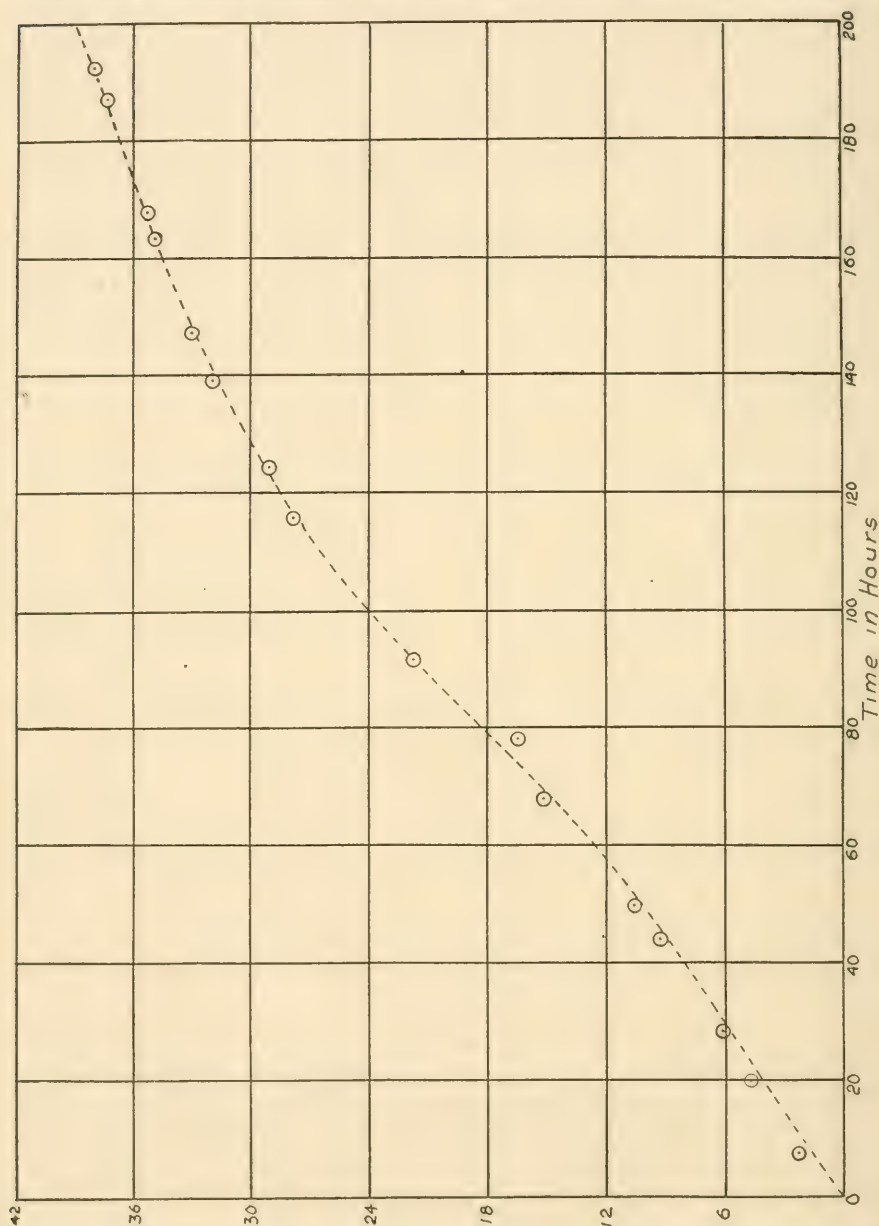


FIG2

Rate of increase of ice mantle prepared with liquid air.

rise increased slightly as can be seen from the curve, Fig. 2, till the end of the fifth day.

Several times during this period the calorimeter was unpacked and the mantle inspected. The mantle was originally perfectly smooth, but at the end of the second day it had a peculiar appearance. It was traversed by fine lines on the surface which had a rough appearance, as though the mantle had grown during the two days. The following day it was again unpacked and the appearance was very much the same. On looking at the mantle, toward the last day, numerous little spicules of ice were seen protruding from the upper part of the mantle in all directions. This showed conclusively that the ice mantle had actually grown. At the end of eight days the calorimeter was unpacked and

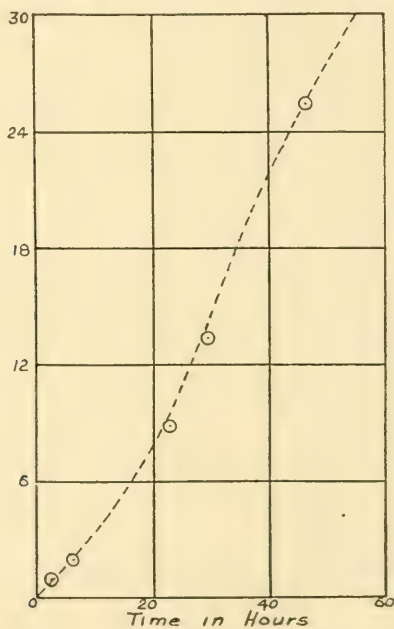


FIG. 3

Rate of increase of ice mantle prepared with salt and snow.

the mantle allowed to melt. All through the experiment fresh snow and water was added to the packing of the calorimeter and the surplus water siphoned off. These additions made no difference to the rate of increase in the mantle. A few rough calculations were made as to the amount of ice formed during these eight days with the following result:

Volume of 100 cm. of capillary = .6619 c.c. Thread rose in capillary 38.11 cm.

Change in volume of ice and water = .2517 c.c. Amount of ice formed = 2.79 c.c.

Area of mantle by rough calculation was about 130 sq. c.

Thus 2.79 c.c. of ice grew on a surface of 130 sq. c., hence the thickness of mantle increased about .021 cm. in eight days.

Second Experiment.

Although great precautions were taken in the previous experiment, it was thought that possibly some impurity might have been present to account for this growth. Accordingly, all the vessels were carefully

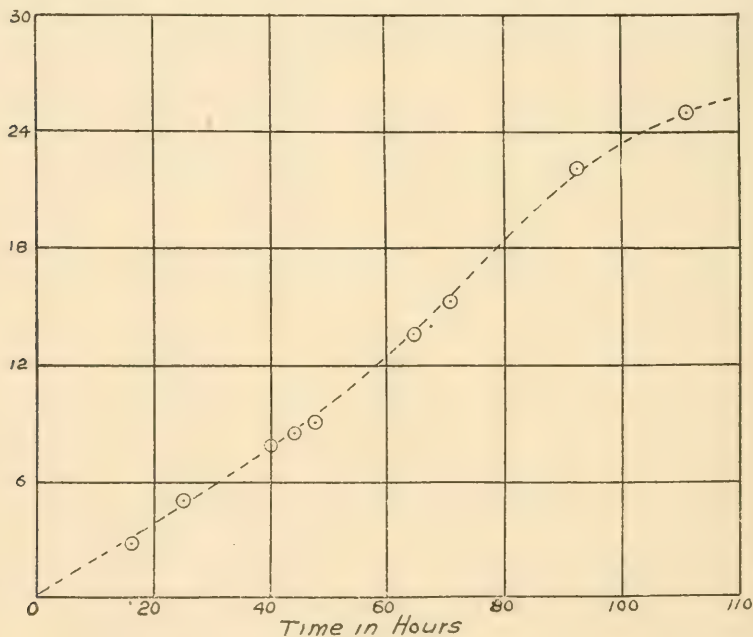


FIG.

Rate of increase with liquid air again.

cleaned and the calorimeter was packed in a mixture of cracked ice and water. The refrigerant used was snow and salt at a temperature of about -15° C. After some trouble a very good mantle was formed. An immediate rise was noted in the capillary, but the rate was much faster than in the previous case. The same increase in the rate was noticed, but this commenced at the end of the first day. Fig. 3 shows this change. The rough appearance of the mantle and the small spicules were again noticed.

Third Experiment.

It was decided to try one more experiment with liquid air as a refrigerant and cracked ice as a packing. This was carried out with almost identical results as in the first case. The curve shows the same change in the rate of rise occurring after the same interval of time.

In this case the change in volume of ice and water was .1635 c.c. giving the volume of ice formed 1.81 c.c. The rate of increase is identical with that in the first experiment. This is shown in Fig. 4.

Fourth Experiment.

The rate of increase using salt and snow at -15° C. as a refrigerant was the same as the second case.

Theoretically the increase in the ice mantle by the gradual growth illustrated by these experiments is very interesting. If we regard water in the neighbourhood of the freezing point as a solution of ice particles, as it is necessary to do to account for the variation of the specific heat and the occurrence of the point of maximum density then it is quite in accord with our knowledge of the natural growth of crystals in a saturated solution. At the freezing point we must admit that the water is saturated with ice particles. Once having started the crystallization of ice, the process continues very slowly as long as the water is kept at the freezing point by a suitable freezing point mixture.

Why the rate of change of reading should be different for the two types of refrigerants we are not as yet in a position to explain. It may possibly be due to a variation in the ice density superimposed on the normal rate of growth.

There was a decided difference in the appearance of the ice mantle which was formed by the two methods. That formed by the liquid air was beautifully clear at the start, but after several hours was seen to be traversed by fine radial cracks. The mantle formed by the salt and snow was cracked at the start and presented a very mottled appearance.

The change in the rate of increase in experiments one and three may also be explained by a change of density.

Further experiments are necessary, however, before anything definite can be said on these points.

VI.—*Phenol-phthalein and the Theory of Indicators.*¹

By D. McINTOSH.

(Presented by Prof. B. J. Harrington, and read June 22, 1904).

When an alkali is added to a solution of phenol-phthalein, the production of the deep red colour may be explained in two ways.

The first, due to Ostwald,² accepts phenol-phthalein as an extremely weak acid, and consequently but little dissociated. On the addition of an alkali a salt is formed which is largely dissociated, and the red colour is due to the negatively charged ion.

The second explanation may be called a chemical one, and is based on the change of constitution when phenol-phthalein is made alkaline. The phenol-phthalein is changed from a lactone.

$C_6H_4 < \begin{smallmatrix} C \\ C \end{smallmatrix} \begin{smallmatrix} (C_6H_4OH)_2 \\ O \end{smallmatrix} > O$, to the salt of a carboxyl acid,

$(MOOC\ C_6H_4) (HOOC\ C_6H_4) C : C_6H_4 : O$; and to the quinoid complex $C : C_6H_4 : O$ the red colour is ascribed.

This view seems the more likely one from the standpoint of organic chemistry. In the organic dyes, colour is associated with a certain chromophoric group, and disappearance of this group means disappearance of colour. Indeed Nietski and Burckhart³ have prepared coloured ethers of tetra-bromphenol-phthalein which are necessarily non-ionized and which contain the quinoid group, and colourless isomeric lactoid ethers, without this chromophoric group.

Strongly supporting the "chromophoric" theory is the fact that the addition of a large amount of salt to an alkaline solution of phenol-phthalein causes the colour to gradually fade. While this may be due to a change in dissociation of the salt of phenol-phthalein, i.e., to the disappearance of the negative ion, the slow colour change indicates rather a chemical change.

I have at various times carried out some experiments with phenol-phthalein, with the object of testing the above theories: and while these experiments have led to no definite results, they are, I believe, new and may be of interest.

If solutions of phenol-phthalein and sodium hydroxide in alcohol are mixed, a red colour is produced. On warming, the colour becomes

¹ Stieglitz. Amer. Chem. Soc., 25, 1112 (1903).

² Ostwald. Lehrbuch der allgemeinen Chemie.

³ Ber. der Chem. Ges. 30, 175 (1897).

much more intense. On cooling to -80° C., the colour disappears, but reappears on warming to the room temperature. At a low temperature an abnormally large amount of alkali must be used in order to bring out the red colour—a fact which may be explained by the decreased dissociation of salts in alcoholic solution. I am not aware of any experiments on the change of dissociation of salts dissolved in alcohol at low temperatures, but it seems unlikely that dissociation plays a prominent rôle here. The phenol-phthalein probably exists as a lactone at low temperatures; and on heating¹ is changed into an acid.

Phenol-phthalein dissolves in the liquefied halide-acids to form strongly coloured, conducting solutions. Carboxyl acids do not conduct, as a general rule, in these acids, and it seems probable that the phenol-phthalein has the lactone formula. If so, in order to conduct the current the phenol-phthalein must be ionized, and the presence of the negative ion is indicated, according to Ostwald's theory, by the beautiful red colour. A similar experiment can be shown with liquefied ammonia. In all cases the phenol-phthalein is not permanently changed, but appears quite sensitive after this treatment.

If alkaline phenol-phthalein be placed in U tubes and covered over with dilute alkali and a current be passed through the solution, the red colour moves, apparently, to the anode. These experiments were not always satisfactory, but seemed in the majority of cases to indicate that the red colour is due to a negatively charged ion.

¹ Compare with acid solutions of tetra-methyl-diamido-triphenyl-carbinol.

VII.—*The Variation of the Valency of Elements with Temperature.*

By E. H. ARCHIBALD and D. McINTOSH.

(Presented by Prof. B. J. Harrington, and read June 22, 1904).

Of the many points in chemical theory over which controversy has raged, none, perhaps, has been the centre of a greater struggle than the question of changing valency—a question which has been definitely settled only in the last few years. For a long time chemists ascribed a definite valency to each element, and where compounds were known which did not easily conform to this view, they were looked upon as “unsaturated.” Lately, with the discovery of many new compounds, this theory of the unsaturated element has been put farther and farther in the background, so that now nearly all chemists are agreed that valency is not a fixed property, but depends on certain conditions, of which temperature is probably one of the most important.

A great deal has been written concerning the variation of valency with the atomic weight, as illustrated by the periodic arrangement of the elements, according to Mendeléef, Meyer and others. For the metallic elements this variation is in most cases regular, and the metals of any one group show the same valency towards a great many different elements. In the case of the non-metallic elements, this regularity is not so apparent. Sulphur, for instance, forms three compounds, H_2S , SO_2 and SO_3 , in which the sulphur functions as a dyad, a tetrad, and a hexad, respectively. It is well to remember, as Ostwald points out, that the compounds of these elements from their very nature do not lend themselves to the same careful study as those of the metals. One point seems strongly brought out from a study of the periodic table, *i.e.*, that the valency of an element is determined, to a very great extent, by the nature of the body with which it is united; and so we have comparatively few cases where two elements unite in various proportions, and in these only rarely, as in the case of the chlorides of phosphorus, is the valency change referred to but one of the elements.

The effect of heat on the pentachloride of phosphorus is well known. It is broken up into phosphorus trichloride and chlorine; that is, the phosphorus is changed from a pentad to a triad. Many such cases might be cited in which heat has the effect of lowering the valency. The decomposition of ammonium chloride, of ammonium sulphide, of nitrogen peroxide, and the change, with temperature, in the molecular weights of phosphorus, bromine and iodine, will occur

to every one. Various organic bodies are found to polymerize when their molecular weights are determined by the freezing point method; while measured by the boiling point method they have normal molecular weights. In the case of alcohol and acetic acid this polymerization can be easily explained by assuming oxygen a tetrad—an explanation advanced by Ramsay. Indeed, Ramsay has shown from his surface-tension measurements that such an assumption is necessary, since water, alcohol, and various other bodies undoubtedly form complex molecules at low temperatures.

The effect of temperature on valency was first emphasized by Friedel¹ from his studies on the union of hydrochloric acid and ether. To explain the formation of this body he assumed tetravalent² oxygen; and although the constitution which he gave to his compound is incorrect and the oxygen has probably a valency much higher than he supposed, the importance of his conclusions cannot be over-estimated.

During the past winter we have made a study of the conductivities³ of various organic bodies dissolved in the liquefied halogen halides. These measurements were made at temperatures between -50° and -150° C., and gave, in some cases, very unexpected results.

Our experiments showed that substances such as the alcohols, ethers, ketones, etc., and some nitrogen compounds, i.e., substances containing an atom to which changing valency might be ascribed—dissolved in the liquefied gases with a great evolution of heat to form conducting solutions, and that the molecular conductivity decreased enormously with dilution—a result which, taken into consideration with the heat evolution, could only mean the formation of chemical compounds. We give here a series of conductivity measurements. The method of experiment we shall discuss in another place.

Triethyl Ammonium Chloride in Hydrogen Iodide.

Concentration. (gramme-molecules per litre).	Mol. Cond. $\times 10^{-6}$
.035	72
.045	109
.066	234
.098	433
.117	651
.138	797
.177	1150
.217	1484
.261	1908
.319	2370
.397	2977
.464	3586

¹ Friedel. Bull. Soc. Chim. (2) 24, 166, 241 (1875).

² J. C. S. 75, 710 (1899); Ber. 34, 2679, 3612 (1901); 35, 120* (1902).

³ Begun by Dr. Steele and one of us.

Keeping in mind the work of Friedel, we tried to produce addition compounds of the acids and organic bodies. Of these we investigated but three classes, the ketones, the alcohols, and the ethers, and succeeded in isolating the compounds¹ and in analysing them. They are colourless, crystalline bodies with melting points, in general well above the melting points of the substances from which they are formed. They easily form supersaturated solutions, from which they can be crystallised by a small amount of the solid phase.

In the case of the compound formed from hydrogen iodide and ether, the analyses showed one molecule of acid to one of ether. Assuming the oxygen tetravalent, the constitution of the body can be represented thus:—



and since iodine in hydriodic acid at low temperatures is a monad,² it seems probable that the former structure is the correct one.

In the following table we give a summary of the results obtained from a study of these addition compounds. In the majority of cases the proportion of acid to base was obtained by analysis; in three cases by synthesis in a manner previously described. The decomposition (melting) point of the compound is also given and the quantivalence of the oxygen,³ assuming that the acid molecules attach themselves to it.

	Molecules Acid.	Molecules.	Melting Point.	Valency of Oxygen.
HI	1	Acetone 2	—18	4
	1	Ether 1	—18	4
	2	Alcohol 1	—70	6
HBr	1	Acetone 1	— 9	4
	1	Ether 1	—40	4
	2	Alcohol 1	—85 (?)	6

¹ Proc. Chem. Soc., June, 1904.

² Proc. Roy. Soc., May, 1904.

³ The oxygen valency is probably not greater than six; the chlorine may increase to three.

	Molecules Acid	Molecules	Melting Point	Valence of Oxygen
	5	Acetone 2	-85	8
H Cl.	5	Ethyl Ether 1	-92	12
	5	Methyl Ether 1	-120 (?)	12
	5	Alcohol 1	-120 (?)	12

We have lately made several compounds of the halide acids and mixed ethers. They unite in the proportion of 1.1.

We see here the effect of temperature on the valency of oxygen. As the temperature decreases the valency increases, changing from four to perhaps twelve. Similar results would be obtained, we believe, were analogous compounds of sulphur, tellurium and selenium investigated.

Valency of Nitrogen.

We have measured the conductivity of nitrogen compounds in the hydrogen halides and find invariably a decrease of molecular conductivity with dilution. This points to the formation of compounds in solution, and since in the case of triethyl ammonium chloride our compound contains saturated (pentad) nitrogen, we believe that the nitrogen takes on a valency higher than five. We have made no effort to isolate these compounds.

Hydrocyanic acid, the various nitriles and sulphocyanides conduct well in the halogen acids, and so, doubtless, do the isocyanides. A careful study of the conductivities of these bodies is to be desired, since it might throw light on the oft-discussed question of their constitutions.

VIII.—*A Revision of the Atomic Weight of Potassium.*I. *The Analysis of Potassium Chloride.*

By E. H. ARCHIBALD, A.M., Ph.D.

(Presented by Prof. B. J. Harrington, and read June 22, 1904).

Although the compounds of potassium are both plentiful and numerous, and many of them have been well studied, yet the number of investigations which have had for their object the determination of the atomic weight of this element, is not as large as one should expect. Indeed, the value at present accepted rests almost entirely upon the work of Stas and Marignac; but very different interpretations are given of this work, so that, while the international committee deduce the value 39.15, Richards gives 39.14, while Clarke proposes as low a value as 39.11. Some analysis of potassium iodide, which gave a very low number for this constant, accounts for the number given by Clarke; while the later work of Stas furnishes the data for the value given by Richards.

Quite recently, Richards and Archibald¹ studied the decomposition of potassium nitrate in the presence of pure silica, and from their observations found the value 39.141. A few determinations were also made of the chlorine in a sample of potassium chloride, purified by means of the chloroplatinate, and these analyses give 39.139, a number in good agreement with the value found from the nitrate analysis.

As no serious difficulties are encountered in preparing pure potassium compounds, it was thought advisable to extend the study of potassium chloride to include the analysis of a sample which had been subjected to a different method of purification from that examined by Richards and Archibald; also to make an extended series of analyses of potassium bromide. The following is an account of the analysis of potassium chloride.

There is no need to review here the work which has already been done on the atomic weight of potassium. This has been most completely done by Clarke.² For purposes of comparison, the results of the analysis of potassium chloride given by Richards and Archibald are reproduced here. In calculating these values, the atomic weight of silver was taken to be 107.930, and chlorine 35.455, oxygen being 16.000.

¹ Proc. Amer. Acad., 1903, 38, 443.

² Constants of Nature, Part V. Smithsonian. Misc. Coll. 1897.

The Ratios of Potassium Chloride to Silver Chloride.

Weight of <i>KCl</i> in vacuum.	Weight of <i>AgCl</i> in vacuum.	Ratio <i>AgCl</i> : <i>KCl</i> = 100.000 : x	Atomic Weight of Potassium.
2.50019	4.80600	52.022	39.137
2.50391	4.81325	52.021	39.136
average		5.2022	39.137

The Ratios of Potassium Chloride to Silver.

Weight of <i>KCl</i> in vacuum.	Weight of <i>Ag</i> in vacuum.	Ratio <i>Ag</i> : <i>KCl</i> = 100.000 : x	Atomic Weight of Potassium.
2.50019	3.61747	69.114	39.140
2.50391	3.62283	69.115	39.141
average		69.115	39.141
Mean value of Series I and II.			39.139

The Preparation of Pure Material.

Chemically pure potassium sulphate was successively crystallised five times, the mother liquor being discarded each time, and the crystals carefully drained and washed with a little water. Barium chloride was purified first by precipitating three times with hydrochloric acid, then four times with carefully purified alcohol. No indication of the presence of strontium or calcium could be found when the residue from the last two mother liquors was examined in the spectroscope.

The pure potassium sulphate was now converted into the chloride by means of the purified barium chloride, still leaving a slight excess of potassium sulphate in the mother liquor. The potassium chloride was then reprecipitated eight times with hydrogen chloride, generated by boiling a concentrated solution of hydrochloric acid. After the third precipitation no barium could be detected by means of the spectroscope in the residues from the mother liquors, although traces were found in the first two. These final precipitations were all carried out in platinum vessels.

Silver.—The method followed in purifying the silver was much like that employed by Richards and Parker¹ in their investigation on

¹ Proc. Amer. Acad., 1896, 32, 55.

the atomic weight of magnesium. Chemically pure silver nitrate was dissolved in enough water to give a solution containing about five per cent of silver. Hydrochloric acid was then added until all the silver had been thrown down as chloride. This precipitate was thoroughly washed with water and then reduced with an alkaline solution of moist sugar; again thoroughly washed, dissolved in nitric acid and the above process repeated. After being reduced the second time, the silver was fused on sugar charcoal before the blow-pipe, into pellets weighing about 20 grams each. One of these was dissolved in nitric acid, the excess of acid driven off and the silver nitrate made up to a solution of about 25 per cent. In this solution the remaining silver was electrolysed, using a very weak current. Under these conditions the silver separates out in crystals of considerable size. These crystals were collected, washed and fused on a boat of pure lime (made by igniting a mixture of lime and anhydrous calcium nitrate) before the blowpipe. Every precaution was taken to ensure the complete expulsion of any oxygen which may have been absorbed by the fused silver.

These pellets of pure silver were now cut up into pieces of the proper size with a clean steel chisel, treated first with hydrochloric acid, then with ammonia, and finally with a little nitric acid. They were kept under distilled water until used.

The water used was distilled and condensed in block tin vessels. It left no residue upon evaporation, and was free from ammonium compounds. Samples were always tested in the nephelometer¹ before using for the presence of chlorides.

The different acids used were redistilled, the first and last portions of the distillate being discarded in each case. The nitric acid which was to be used to dissolve the silver was always tested in the nephelometer for the presence of chlorine ions.

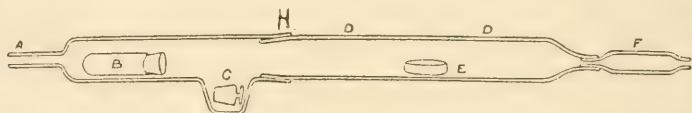
Method of Analysis.

In the case of the analysis given above (by Richards and Archibald)¹ the potassium chloride before being weighed had been ground very fine and heated in a current of dry pure nitrogen to a temperature very little below the point of fusion; being subsequently bottled in an atmosphere of dry air. It is probable that the error due to the retention of any water or mother liquor in the fine crystals at this high temperature would be very small, more especially as the salt had been precipitated from a hydrochloric acid solution, and the mother liquor contained about the same per cent of chlorine as the salt. In the

¹ Richards. Proc. Amer. Acad., 1894, 30, 385.
Sec. III., 1904, 4.

present case, however, it was found possible to fuse the chloride and bottle it under the same favourable conditions mentioned above, so that even this error must have been entirely eliminated. The apparatus necessary for preparing and drying the nitrogen and, when necessary, delivering a stream of dry air, was quite similar to that described in the paper on the Atomic Weight of Caesium.¹ Air saturated with ammonia was passed over heated copper, and the resulting nitrogen dried by passing through sulphuric acid, a tower filled with solid potassium hydroxide, then over resublimed phosphorus pentoxide, into the Richards' bottling apparatus, where the fusion took place.

The following figure will give an idea of this bottling arrangement.



A—Tube leading from phosphorus pentoxide; B—weighing bottle; DD—hard

FIG. 1.—BOTTLING APPARATUS, HORIZONTAL SECTION.

glass tube; E—platinum boat containing fused potassium chloride; F—tube containing phosphorus pentoxide to prevent any moist air from diffusing inward.

The fusion of the salt takes place in the platinum boat E, while a current of dry nitrogen is passing through the apparatus. After the salt has cooled the nitrogen is swept out with a stream of dry air; the tube F is then removed, a long glass rod inserted and the platinum boat and contents pushed over into the weighing bottle B. A slight twist given to the apparatus allows the stopper C to fall out of its niche. It is then pushed home, the apparatus disconnected at H, and the weighing bottle and contents transferred to a desiccator. All the weighings are carried out by substitution. In addition to the weighing bottle containing the platinum boat, another one of almost the same size and weight is prepared, and in this is placed a quantity of platinum equal in weight to the platinum boat. This tube and its platinum contents is then used as a tare when weighing the other tube plus the platinum boat. Under these conditions no correction need of course be applied to the platinum boat and bottle for the buoyancy of the air, but only to the salt which is being weighed.

The bottles were allowed to stand in a desiccator for two or three hours before weighing. The salt was then dissolved in about two-thirds of a litre of water, contained in an Erlenmeyer flask fitted with a ground glass stopper. These solutions were always neutral and quite free from any insoluble residue. The platinum boat showed no signs of having been attacked by the fused salt.

¹ Loc. cit.

A quantity of silver, slightly in excess of the amount required to precipitate the chlorine in the potassium chloride, had meanwhile been weighed out and dissolved in nitric acid. Care was taken that none of the silver should be carried away in the escaping vapours while solution was taking place. When the silver had dissolved, the solution was diluted to about 500 c.c. The silver chloride was then precipitated in a dark room. The contents of the flask vigorously shaken for half an hour and then set away for several hours or perhaps over night. A Gooch crucible, fitted with an asbestos mat, is now prepared. The asbestos used was carefully selected and thoroughly purified by treatment with acids. The mat is washed on the filter pump with over a litre of water, and dried in an electric oven for an hour, at a temperature of 125° C. After standing in the desiccator for a sufficient length of time the crucible is weighed, using another platinum crucible of the same weight as a tare.

In washing the precipitated silver chloride, the procedure was about as follows:—After filtering through the mother liquor, and washing the precipitate twice by shaking it vigorously each time with about 150 c.c. of water (adding these washings to the main filtrate), about 300 c.c. of water was added, and this was shaken up vigorously and set aside for several hours. This is then poured through the filter, keeping this filtrate by itself. This treatment was repeated with about the same amount of water, and the silver chloride then washed on to the filter, dried for several hours, or perhaps over night, at a temperature of about 125° C. in the electric drying oven, finally dried in a desiccator for three or four hours, and then weighed with the same care that was taken with the empty crucible.

It should be stated that the filtering and washing above described was carried out in either a subdued or a ruby light, the silver chloride being at all times protected from strongly actinic rays. As silver chloride is slightly soluble in water, some of the precipitate must have been dissolved by the 600 cc. used in the final washing. To determine this, the method worked out by Richards was adopted. By means of the nephelometer, a solution containing a known amount of silver was compared with the unknown solution, hydrochloric acid being added to the former and silver nitrate to the latter. The amount of silver chloride found in the washing water was of course added to the observed weight of the precipitate.

Corrections were also applied where they were appreciable for the asbestos carried away in the filtrate. This was determined by filtering through an ashless filter, igniting, and weighing the residue. This

correction was very small, seldom amounting to as much as .2 of a milligram.

The amount of moisture still remaining in the dried pellet of silver chloride was estimated in the manner followed by Stas, namely, by heating the precipitate just to fusion in a tarred porcelain crucible, the loss being then subtracted from the observed weight of silver chloride.

As stated above, the silver which had been weighed out was slightly in excess of the amount necessary to precipitate the chlorine in the potassium chloride taken for analysis. This excess must be known before one can determine the ratio of silver to potassium chloride. It was estimated by adding to the filtrate a slight excess of hydrochloric acid and washing and weighing the precipitated silver chloride with the same care as attended the treatment of the main precipitate. In this case a little hydrochloric acid in the washing water prevented any appreciable amount of the silver chloride from dissolving.

Before the observed weights of potassium chloride could be corrected for the buoyancy of the atmosphere, it was necessary to know the specific gravity of this salt. This constant has been measured accurately by a number of experimenters; for the purpose of this work the number taken was 1.995. The corresponding constant for the silver chloride was 5.55.

The balance used in this research had been specially procured for atomic weight work. It was a long-armed Trömmner balance, sensitive to 0.02 milligram, with a load of forty grams. The beam and pans were of aluminium, the rest of the metal being gold-plated. The weights were carefully compared among themselves, according to the method suggested by Richards.¹

Results of the Analysis of Potassium Chloride.

The ratios obtained from the analysis of the potassium chloride are given below. The atomic weights used in the calculations have the same values as in the table above.

¹ Jour. Am. Chem. Soc., 1901, 22, 144.

Ratios of Silver Chloride to Potassium Chloride.

No. of Analysis.	Weight of <i>AgCl</i> in vacuum.	Weight of <i>KCl</i> in vacuum.	Ratio <i>AgCl</i> : <i>KCl</i> = 100.000 : ×	Atomic Weight of Potassium.
1	4.25916	2.21586	52.028	39.142
2	3.83250	1.99379	52.023	39.138
3	5.57396	2.89977	52.025	39.139
4	9.10362	4.73606	52.026	39.140
average			52.026	39.139

Ratios of Silver to Potassium Chloride.

No. of Analysis.	Weight of <i>Ag.</i> in vacuum.	Weight of <i>KCl</i> in vacuum.	Ratio <i>Ag</i> : <i>KCl</i> = 100.000 : ×	Atomic Weight of Potassium.
5	3.20593	2.21586	69.116	39.142
6	2.88479	1.99379	69.114	39.140
7	4.19557	2.89977	69.115	39.141
8	6.85280	4.73606	69.111	39.137
average			69.114	39.140
Average of Series I and II =				39.140

The agreement of this value with that from the earlier work on the chloride and nitrate is all that could be desired. It would seem of little use to further extend the work on the chloride, but a thorough study of the bromide is very desirable. It is hoped that this part of the work will be completed shortly.

IX.—*On the Radioactivity of Natural Gas.*

By DR. J. C. McLENNAN, of the University of Toronto.

(Read June 22, 1904.)

In a paper by Mr. E. F. Burton, B.A., recently published in the *University of Toronto Studies, Physical Science Series*, an account is given of some experiments with a highly radioactive gas obtained from crude petroleum. In this investigation it was found that air drawn through crude petroleum became charged with a radioactive emanation, which, from the rate at which its activity decayed and from the nature of the induced radioactivity which it produced, the author concluded to be an emanation from radium.

The present writer has extended this investigation to an examination of the natural gas from different wells in Western Ontario. The gas from every well examined, which included those in the Welland district as well as those near Brantford, was found to be charged with a radioactive emanation. The activity of this emanation was found to decay or die out in all gases to one-half its original intensity in about three days, and the intensity of the induced radioactivity which it produced died down to one-half value in about 40 minutes.

The wells examined varied in their depths, and the amount of active emanation present was found to be practically the same in all wells coming from the same horizon. In the Welland district the gas from those wells which had their source in the Niagara formation possessed the highest initial conductivity. On an arbitrary scale this conductivity is represented by about 1,200. The gas of those wells which had their source in the Clinton limestone possessed an initial conductivity of about 145, while that from the wells coming from the Medina formation gave an initial conductivity of about 680. One well of this group, which had its source in the Trenton limestone, and had a depth of about 3,000 feet, gave but a feeble conductivity of not more than about 147. The highest conductivity obtained in the investigation was that of the gas from a well near Brantford. The conductivity in this case was about 9,000. An investigation of this gas showed that, in virtue of the emanation with which it was charged, there was produced about 15,000 ions per second in each cubic cm. of its mass. A test made on the conductivity of ordinary atmospheric air in the same way showed a production of about 32 ions per cubic cm. per second. This comparison will give an idea of the extraordinary amount of the radioactive emanation present in some of our natural gases.

X.—*An Examination of Some Canadian Micas.*

By J. E. EGLESON, B.Sc.

(Presented by Dr. B. J. Harrington, and read June 23, 1904.)

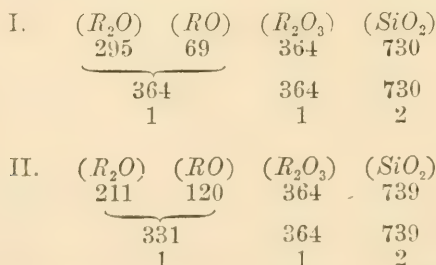
Hitherto very little work has been done in the chemical examination of Canadian micas, and it is hoped that the following series of analyses may prove of interest and value. Complete analyses have been made of six samples, chosen by Dr. Harrington so as to illustrate different modes of occurrence. The muscovites are from coarse pegmatite veins, the biotites and phlogopite from apatite-bearing veins, some of which are now being worked chiefly on account of the mica which they contain, while the lepidomelane is an example of a mica occurring in nepheline syenite.

Localities, etc.

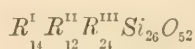
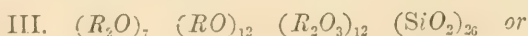
- I. Villeneuve Mica Mine, Ottawa County, Quebec. Muscovite. Colour grayish, pale green by transmitted light. Large axial angle and optic axial plane normal to the plane of symmetry.
- II. Brassard Township, Berthier County, Quebec. Muscovite. Colour rather dark gray, with a brownish tinge by reflected light and greenish by transmitted light. Large axial angle. First order.
- III. Sebastopol (Range X., Lot 31), Renfrew County, Ontario. Biotite. Colour black and lustre splendid. Transparent only in very thin plates. Axial angle small. Second order.
- IV. McFarlane Apatite Mine, Wakefield, Ottawa County, Quebec. Biotite. Colour brownish black; more transparent than No. III. Small axial angle. Second order.
- V. Adams Mine, Portland Township, Ottawa County, Quebec. Phlogopite. Colour light brown, both by reflected and transmitted light. Slightly clouded even in very thin plates; this is possibly due to incipient decomposition. Small axial angle. Second order.
- VI. Monmouth Township (Range IX., Lot 16), Ontario. Lepidomelane. A very black, brittle mica, with small axial angle and high specific gravity.

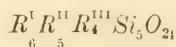
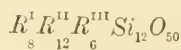
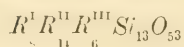
	ANALYSIS.					
	I.	II.	III.	IV.	V.	VI.
Silica.....	44.12	44.44	39.16	39.18	39.94	31.48
Titanium Dioxide.....	0.21	0.23	0.56	0.26	0.16	0.09
Alumina.....	55.74	33.58	27.50	13.29	17.80	19.64
Ferric Oxide.....	3.65	5.64	3.04	5.50	1.05	5.85
Ferrous Oxide.....	0.89	1.07	12.89	3.93	0.67	27.96
Manganous Oxide.....	0.38	0.16	0.54	0.40	0.08	1.61
Lime.....	0.64	0.86	0.22	0.00	0.00	1.33
Magnesia.....	1.59	3.53	4.66	25.08	27.88	2.99
Potash.....	7.89	7.77	6.89	7.76	9.13	4.17
Soda.....	2.08	1.01	1.01	0.96	0.35	1.68
Lithia.....	0.12	0.00	0.00	tr.	0.00	0.00
Water (combined).....	2.88	2.04	1.59	1.83	2.13	3.94
Fluorine.....	0.20	0.46	3.03	2.84	0.86	0.00
	100.39	100.79	101.09	101.03	100.05	100.74
Less Oxygen for Fluorine.....	0.08	0.19	1.27	1.18	0.36	0.00
	100.31	100.60	99.82	99.85	99.69	100.74
Specific Gravity.....	2.84	2.88	3.03	2.95	2.76	3.25

Nos. 1. and II. are true orthosilicates, as shown by the following molecular ratios:—



All the other micas are more basic in character. Their composition may be represented as follows:—





The phlogopite from Portland Township (No. V) is very similar in composition to that from Burgess, Ontario, examined by Clarke & Schneider, except in containing a much smaller proportion of fluorine. The Monmouth Lepidomelane, again, resembles in its composition those occurring in the nepheline syenites of a number of other localities, including Litchfield in Maine and Miask in Norway.

*XI.—On the Loss of Substances, Useful as Plant Food, Sustained
in Moss Manure,*

By THOMAS MACFARLANE.

(Read June 23, 1904.)

In a former paper on the utilization of human refuse, read before the 3rd Section of the Society,¹ I made some reference to the value of the excreta of town dwellers for agricultural purposes, and the various estimates which had been made concerning it. I mentioned the sum of \$2 per person per annum as a reasonable valuation for the towns of this country, but subsequent inquiry has convinced me that such a result can only with difficulty be realized. The authorities which may be consulted as to the investigations which have heretofore been made on the subject are chiefly German, and the results of their labours have been concentrated in Dr. Vogel's work on the utilization of town refuse.² From the figures there given the following may be deduced regarding the quantity in kilogrammes and pounds of fertilizing constituents in the excreta of one average person per annum.

	AUTHORITIES.	IN EXCRE- MENT.	IN URINE.	TOTAL
NITROGEN :—	Wolff and Lehmann.....	0·800 Kg.	4·400 Kg.	5·200 Kg.
	Wolff.....	0·485 “	2·532 “	3·017 “
	Heiden and Müller.....	0·631 “	3·500 “	4·131 “
	Averages.....	0·639 Kg.	3·477 Kg.	4·166 Kg.
	do lbs....	1·406 Lbs.	7·649 Lbs.	9·055 Lbs.]
PHOSPHORIC ACID :—	Wolff and Lehmann.....	0·600 Kg.	0·660 Kg.	1·260 Kg.
	Wolff.....	0·528 “	0·717 “	1·245 “
	Heiden and Müller.....	0·563 “	0·700 “	1·263 “
	Averages.....	0·563 Kg.	0·692 Kg.	1·256 Kg.
	do in lbs.....	1·238 Lbs.	1·522 Lbs.	2·763 Lbs.
POTASH :—	Wolff and Lehmann.....	0·270 Kg.	0·810 Kg.	1·080 Kg.
	Wolff.....	0·121 “	0·844 “	0·965 “
	Heiden and Muller.....	0·194 “	0·832 “	1·026 “
	Averages.....	0·195 Kg.	0·828 Kg.	1·023 Kg.
	do in lbs.....	0·429 Lbs.	1·821 Lbs.	2·250 Lbs.

¹ Transactions of the Royal Society of Canada, Vol. VIII, p. 87.

² Die Verwerthung der städtischen Abfallstoffe; Berlin, Paul Parey, 1896.

These average quantities of fertilizing substances at reasonable rates make up the following valuation:—

9·055 lbs. Nitrogen at 13c.....	\$1·18
2·763 “ Phosphoric acid at 5c.....	0·14
2·250 “ Potash at 5c.....	0·11
	<hr/>
	\$1·43

This valuation is considerably less than the ordinary estimate of \$2 per year and person. It is besides to be remembered that the experiments upon which the foregoing estimate is based were, for the most part, made upon individuals, and that great care was taken to avoid loss of any of the products. For obvious reasons this would not be possible in the case of collecting excreta in our towns and cities, and it becomes a question as to what the value of these amounts to, under the ordinary circumstances of the mass of their population.

In order to obtain reliable figures from actual experience, a dry moss closet was placed in the outside shed of a house in the town of Hull, P.Q., occupied by a family of man, wife and three small children. The closet was constructed as shown in the accompanying drawing, titled “double dry moss closet,” the description on which indicates the manner of working the closet. The essential features of the arrangement are the movable shelf B, upon which the moss absorbent is placed and the excreta received, and the re-use of the resulting moss manure until the absorbent is fully saturated. The latter object is secured by repeatedly transferring the manure from the floor E to the shelf B until it is too moist for use.

This closet was charged in the spring of 1903 with 20 lbs. moss litter, and the product was removed, weighed and sampled in October. The removal and subsequent handling of this product was easily accomplished and without the slightest annoyance to any one. Even in the drying of the sample there were no disagreeable emanations, thus affording another proof of the efficiency of moss litter as a deodorant. The product for the six months weighed 70 lbs. and part of it lost in drying, an amount equivalent to 62·6% water or 43·8 lbs. on the 70 lbs. The dried sample representing 26·2 lbs. assayed as follows:—

Total Nitrogen.....	4·88 per cent.
Phosphoric Acid.....	4·79 per cent.
Potash.....	3·12 per cent.

Calculated upon the 26·2 lbs. of dry product, the fertilizing constituents are as follows:—

	Total lbs.	Value per lb.	Total Value	Total Annual Value	Value per year & person cents	Lbs. fertilizing constituents per year and person
Nitrogen.. .. .	1·28	13c	16·64c	33·28c	11·09	0·85
Phosphoric acid.....	1·25	5c	6·25c	12·50c	4·16	0·83
Potash..... .	0·82	5c	4·10c	8·20c	2·73	0·55
				53·98c	17·98	

The total annual value of the product was therefore only 54 cents, which, divided by three, the number of inmates, amounts to only 18 cents per annum and person instead of the above calculated result of \$1.43. The cause of this enormous deficiency may partially be explained by the facts that much of the excreta of the members of the family had been voided elsewhere, and that the whole of the chamber urine had found its way into the sewer. In fact, it would appear that the quantity of nitrogen saved corresponds only to that of the faeces, or about one-twelfth of the true quantity.

The approach of winter rendered the use of the outside closet above described impracticable. The large amount of moisture contained in the mixture of moss litter and excreta would have rendered it liable to be frozen solid, and its transfer from the lower receptacle to the upper tray would have become impossible. It was therefore arranged to carry out the subsequent experiments in a special "Moss" commode placed in a small apartment upstairs in the dwelling house, and having the construction shown in the accompanying plan. It will be seen that in the case of this commode the movement was communicated to the inclined shelf from the movable seat A.

The use of this commode began on the 1st November, 1903, and on the 31st January, 1904, the contents were removed and sampled, both use and removal taking place without the slightest annoyance to the house inmates. It was charged with 15 lbs. moss litter at the beginning of the experiment, and the product weighed 60 lbs. It smelt slightly of ammonia, and was alkaline to litmus paper, and therefore previous to drying the sample of 435 grammes, 5 cubic centimetres of oil of vitriol mixed with 45 c.c. of water were added to prevent loss of ammonia. The loss in drying amounted to 67·5 p.c., so that had the 60 lbs. of product been dried like the sample it would only have weighed 19·5 lbs. The analysis of the dried sample gave

Total Nitrogen.....	3·33 p c.
Phosphoric acid.....	3·52 p.c.
Potash	1·05 p.c.

This, calculated upon the 19.5 lbs. of product, gives the following quantities and values of fertilizing constituents:—

	Total lbs.	Value per lb.	Total Value	Total Annual Value cents	Value per year & person cents	Lbs. fertilizing constituents per year and person
Nitrogen... ..	0.65	13c	8.45c	33.8	11.37	0.87
Phosphoric acid.....	0.69	5c	3.45c	13.8	4.60	0.92
Potash	0.21	5c	1.05c	4.2	1.40	0.28
				51.8	17.37	

This product of the inside experiment is almost the same in value as that obtained in the outside closet as above described, and shows an equally great deficiency of fertilizing constituents, which is no doubt attributable to the same causes as in the first experiment. If we compare the average produce of these two experiments, in lbs. per person per annum, with the product of fertilizing substances according to the authorities above mentioned, and calculate the percentage of the deficiencies, we obtain the following figures:—

	LBS. PER YEAR AND PERSON			Lbs. producible according to authorities	Deficiencies ; per cent.
	Exp. I.	Exp. II.	Average		
Nitrogen	0.85	0.87	0.860	9.055	90.5
Phosphoric acid	0.83	0.92	0.875	2.763	68.3
Potash.....	0.55	0.28	0.415	2.250	81.5

These enormous deficiencies show that in calculating the quantity of fertilizing materials obtainable from human refuse in towns and cities it is quite impossible to rely upon the results of direct experiments on individuals. The greatest deficiency is found in the case of the nitrogen, and since it is the most valuable fertilizing substance, and 84% of the nitrogen in human excreta is contained in the urine, it seemed of advantage to inquire as to how the loss of this element in the treatment of moss manure is sustained. With this end in view, the following laboratory experiment was carried out:—

A cylindrical wire basket, 8 inches high and 6 inches in diameter, with meshes $\frac{3}{8}$ inch wide, was nearly filled with a mixture of moss manure and fresh moss litter. The moss manure was the product of

previous experiments, and was carefully analysed as to its nitrogen contents. To the mixture there was added from time to time successive quantities of urine, but always in such measure as not to supersaturate the moss. The basket was placed in a porcelain capsule so as to prevent loss from dripping. Not only did evaporation take place from the moss as it stood, but it was from time to time emptied out of the wire basket and thoroughly mixed. In this way every opportunity was given to the mixture to throw off its moisture. The experiment was carried on for about three weeks, and then a comparison made as regards the nitrogen contained in the materials used, as well as in the product. The former were as follows:—

	Grammes Nitrogen
410 grammes moss manure which, after drying would have amounted to 300 grammes with 3·2 per cent. Nitrogen	9·60
150 grammes Welland Moss with 1·56 per cent. Nitrogen	2·34
2206 grammes urine containing 0·82 per cent. Nitrogen..	18·09
Total	30·03

The product of the experiment weighed 483 grammes, and contained 3·22% nitrogen, equal to 15·55 grammes, or 15·48 grammes less than in the materials used. Since, however, the nitrogen in the original moss manure and in the moss litter must be regarded as fixed, it follows that the loss must have been sustained by the nitrogen of the added urine, amounting to 18·09 grammes. Of this only 3·61 was recovered, thus showing a deficiency of 14·48 grammes, or 84·04 p.c. of the nitrogen of the urine. This must have escaped along with the 2283 grammes of water evaporated in the course of the experiment.

The foregoing trial was repeated more than once under slightly different conditions, and results invariably obtained which went to prove that almost the whole of the nitrogen contained in urine is lost when the latter is absorbed by moss litter, and its water allowed to evaporate spontaneously with unlimited access of air. The urea is perhaps completely resolved into carbonic acid and ammonia, but the odour of the latter is not very strongly manifested, and possibly some of the nitrogen of the urea may have escaped in the free state.

A series of experiments was next undertaken for the purpose of retaining the nitrogen as ammonia by mixing with the moss litter substances containing salts and acids capable of fixing the volatile alkali. The urine was absorbed by the moss litter, and allowed to dry gradually as above described. It is unnecessary to give all the particulars regarding these trials, but it may be stated that in all cases sufficient

of the added substances was used to effect the retention of the ammonia if all the nitrogen of the urine had been developed in that form. The results were as follows:—

	Proportion of substances to Urine as 1 to	Loss of Nitrogen
A mixture of equal parts of bone super- phosphate and double manure potash salt	6·11 8·91 3·36	16·0 p. c. 24·1 p. c. 31·1 p. c.
Sulphate of magnesia.....	6·75	38·5 p. c.
Land plaster, ground.....	6·32	28·1 p. c.
do do	10·76	60·7 p. c.

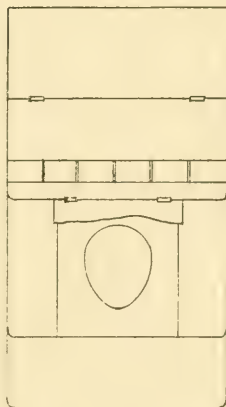
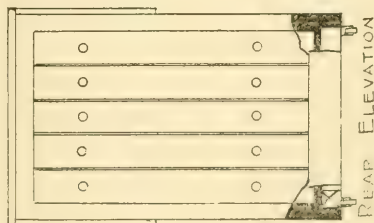
These results lend confirmation to the idea already expressed that urea in decomposing under the above described circumstances is not all resolved into carbonic acid and ammonia, but that a varying quantity of nitrogen escapes in the free state. The presence of acid and neutral substances capable of fixing ammonia does not prevent this, and the development of nitrogen seems to be owing to the excess of air which was used in these experiments. This unlimited access was of course necessary for the elimination of moisture, an advantage, however, which cannot possibly compensate for the loss of nitrogen. There cannot be any doubt that in the ordinary treatment of barnyard manure the same influences are at work, and that in spite of the presence of substances capable of retaining ammonia, losses of nitrogen take place when the manure heaps are allowed too great a degree of porosity.

This subject is far from being exhausted, and my experiments are still being continued with the object of depriving moss-manure of the large amount of water it usually contains without sacrificing any of its fertilizing constituents.

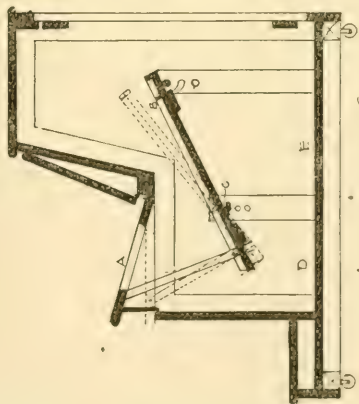
MOSS COMMODE

SCALE 1 IN = 1 FT

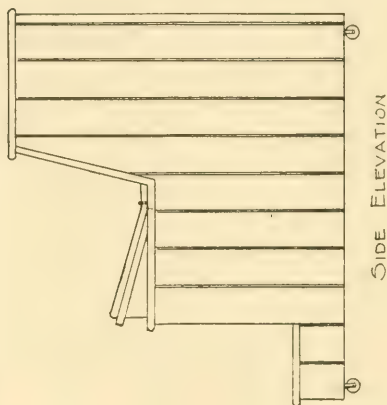
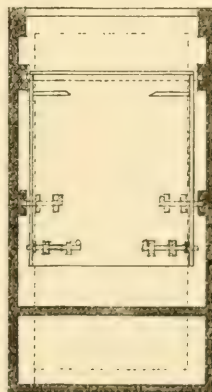
- A MOVABLE SEAT WITH OPENING
 B MOVABLE SHELF FOR ABSORBENT
 C BOLTS FORMING PIVOT ON WHICH
 SHELF WORKS
 D SPACE FOR COLLECTING MOSS MIXTURE
 E FLOOR FROM WHICH TO TRANSFER
 MIXTURE TO SHELF



LONGITUDINAL SECTION



HORIZONTAL SECTION

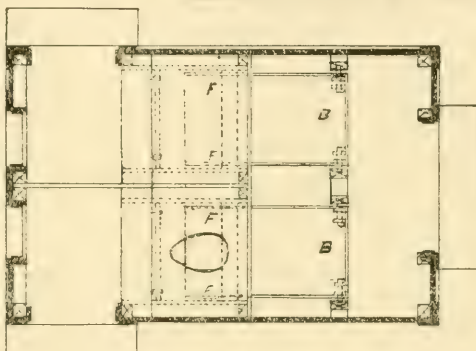


DOUBLE DRY MOSS CLOSET

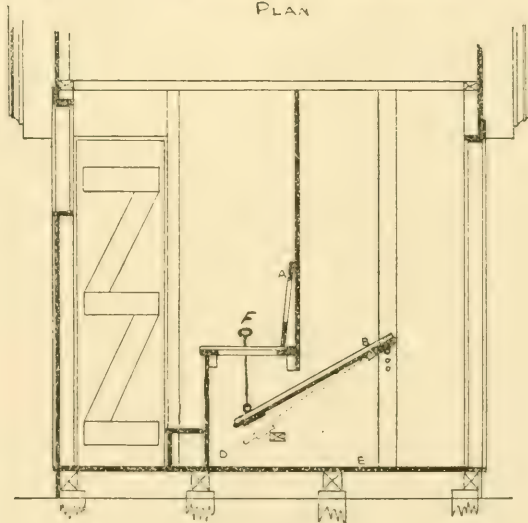
SCALE $\frac{1}{2}$ " = 1 FT

- A SEAT OR LID WITH OPENING IN IT
 B MOVABLE SHELF FOR ABSORBENT
 C CONTINUATION OF 'B. FOR RECEIVING EXCRETA
 D SPACE FOR COLLECTING MOSS MANURE
 E FLOOR FOR DRYING MANURE
 F ROD ~~FOR~~ ~~MOVING~~ ~~SHELF~~ FOR MOVING SHELF

6" 1 2 3 4 5 6 Feet



PLAN



SECTION

XII.—*Notes on the Difference of Temperature, McGill College Grounds and Mount Royal, Montreal, Canada.*

By PROF. C. H. McLEOD and DR. HOWARD T. BARNES.

(Read June 23, 1904.)

In 1897 the British Association made a grant of £50 towards the investigation of the changes in temperature due to differences in altitude at Montreal. In the early summer of 1899 the Callender electric recorder was installed at McGill College, one thermometer being on the summit of Mount Royal and the other on the grounds of the College. The conducting leads were No. 14 copper with ordinary composition insulation. The records obtained in dry weather were satisfactory but the insulation was not sufficient for wet weather conditions and the work was abandoned until such time as a lead-covered cable could be procured.

A gift of \$300 from Sir Wm. Macdonald placed the funds for the erection of the cable at our disposal in the summer of 1903, and the records were obtained under the improved conditions as to wire connection, in July of that year.

The mountain thermometer is 47 ft. above the ground and 800 ft. above sea level and is enclosed in a single screen cage. The thermometer on the College grounds is 4 ft. above the surface of the soil and 180 ft. above sea level. It is protected by a double screen. The difference in elevation of the two thermometers is as above, 620 ft. The mountain station lies in a direction approximately NW. from that on the College grounds and at a horizontal distance from it of about 3,300 ft. The length of the connecting leads is 4,100 ft. They are of No. 16 copper wire, paper-covered and enclosed in a lead cable which is suspended from a steel cable on poles.

A complete set of the differential recorder sheets (reduced to somewhat less than one-third the actual size) for the month of February, 1904, accompanies this memorandum; also a set of sheets, giving the temperature at the lower station and the temperature deduced for the higher station by plotting from the difference curves. In the latter the full line represents the temperatures at the lower station and the partially dotted line those at the upper station. The vertical scales as numbered represent degrees Fahrenheit.

An inspection of these curves will show that any marked change in temperature at the lower station has been heralded by a change

in the same direction at the higher station by an interval of time, sometimes as great as 24 hours. This interval, which seems to be very variable, depends probably upon wind conditions.

An examination of the diagrams, beginning with the 1st February, shows a rapidly increasing minus difference, while at the lower station the temperature was falling rapidly. In this case the change of temperature at the lower station was anticipated by about five hours. There was, however, a very sudden drop of temperature, accompanied by change in the wind direction. Continuing the examination of the curves it will be seen that the air temperature was abnormally low while the thermometer difference remained very large negatively. On the 3rd and 4th of the month slight diminutions in the difference curve corresponded to increased temperatures at the lower station. It will be noted that the difference curve continued to give a large negative value until about midnight of the 13th, when it decreased rapidly until 6.30 a.m. of that day, at which time it reached the zero line. Notwithstanding this change, the temperature at the lower station followed the diurnal curve until noon of the 14th, when the first break in the cold spell was experienced. During this interval (13th at 6 a.m. to the 14th at noon) the difference curve remained small and so continued during the subsequent warm period until lower air temperatures were again established.

The next marked change in the difference curve began at 1.40 a.m. on the 18th, and will be seen to have been the precursor of higher temperatures which set in at the lower station at 11 a.m. No notable departures from normal temperature conditions occurred after this until 12 p.m. February 20th, when the difference suddenly diminished and assumed the positive sign at 4 a.m. Notwithstanding this marked change in the difference curve, the temperature at the lower station continued to fall slightly until 7 a.m. It will here be seen that the difference thermometer predicted by about 12 hours the warm wave which followed. After the return to colder weather, the conditions were again normal until the nights of the 26th and 27th, when there was a similar occurrence to the foregoing, the warm wave being anticipated on the difference record by about 12 hours.

The following table shows the normal differences of the temperatures at the two stations for each of the months covered by records thus far obtained.

MONTH	Mean temperature at lower station in degrees Fahrenheit	Difference between stations in degrees Fahrenheit
1903		
July.	67.72	5.52
August	62.00	4.74
September	59.99	5.87
October.....	48.58	7.62
November.....	32.09	4.56
December.....	14.03	8.18
1904		
January	8.17	11.55
February.....	7.23	8.12
March.....	24.78	5.89
April.....	39.27	6.79
May	59.72	3.73

No attempt has been made to trace the connection between wind or general weather conditions and the differential curves. Without consideration of such effects it would appear that the following relations hold:

a. Normal differences in temperature vary with the average air temperature increasing negatively as temperature falls.

b. Departure from normal differences in a negative direction indicates lower air temperatures and in a positive direction change to warm weather.

Resistance Tests on the Recorder and Line.

At the outset, before we undertook the series of measurements of the difference of temperature between the mountain and the observatory, we satisfied ourselves on many points in connection with the accuracy of the recorder and leads.

Our first tests were made on the insulation of the line. The leakage between the different wires leading up to the mountain and between these wires and the earth, during a period of prolonged wet weather, was obtained when any fault in the insulation would have been at once apparent. These tests were carried out with a battery and a high resistance electric tester. The deflection was obtained

of the battery through one megohm, and this deflection compared with that obtained with the leakage currents. It was found that the insulation was better than 100,000 ohms for the entire length of cable, which was considered quite satisfactory and it was probably greater than this during dry weather.

The resistance of the main leads, and compensating leads, was measured on the Wheatstone bridge, and was found to be about 40 ohms. A slight difference between the two pairs of leads was observed, amounting to about half an ohm. To rectify this and in order to bring the zero of the instrument as nearly as possible to the middle of the scale, a small coil of copper wire was wound and placed in series with the leads of lowest resistance. This coil was placed outside, in the thermometer box at the Observatory, for it was considered important that this coil should undergo approximately the same variations of temperature as the rest of the line. New ratio coils were added to the recorder, of .50 ohms each, and adjusted very carefully by means of the Kelvin-Varley slide. It was found that the instrument was more sensitive with these coils. There was no record of the resistances of the ratio coils that we removed, but it is supposed they were about 25 ohms.

A most important test of the accuracy of the instrument was the steadiness of the zero, which gave a severe test of the compensation of the line. This zero was tested in several ways.

In the first test, the compensating leads and thermometer leads were connected together, with the thermometers removed. The recorder was set to trace the variations in the leads. Several traces were obtained in this way and show small variations of about $1/2$ a degree either way from the zero, indicating that possible strains on the wire, due to wind or other sources of disturbance, produced slight changes in the resistance, not immediately compensated. The average line traced, however, over a long period, was very close to the zero mark.

In the second test, the two thermometers were added to the circuit and placed side by side in the Observatory, near the recorder. A similar line was traced as before.

In a third test, the thermometers were put in their proper places, one on the mountain and the other in the thermometer box at the observatory, and the bulbs were immersed in a mixture of ice and water. The zero line traced in this way was of the same character as the zero traced in the other two tests, and was taken to be the true zero of the instrument. In all, these tests extended over about two weeks and were satisfactory.

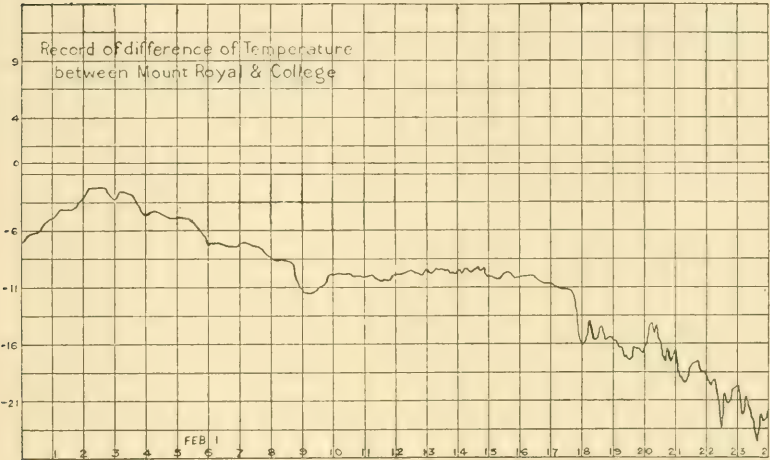
The small variations which we observed on the compensating and thermometer leads in the first test, shown also in the traces given by the other tests, indicate that the slight wavy character of the various records obtained may be due to some unavoidable variations in the resistances of the leads. It is possible, however, to distinguish these changes in the leads on the curves that we obtained and to distinguish them from the more rapid and decided changes of air temperature.

Test of Sensitiveness.

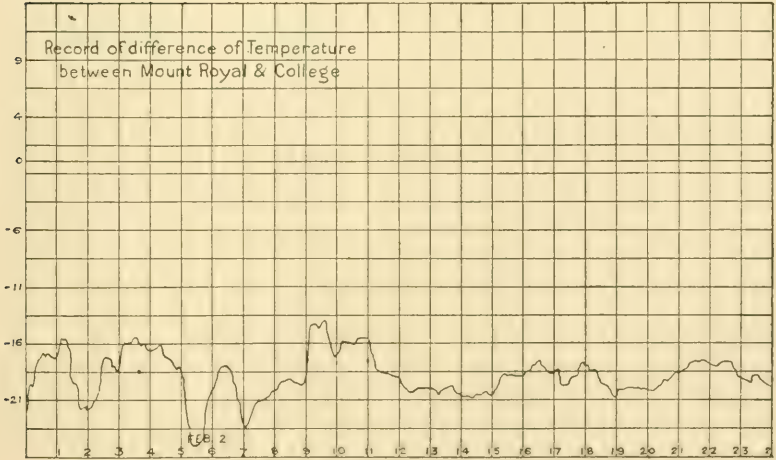
As we had no record of the value of the bridge wire on the recorder, we were obliged to determine this by special experiment. This test also furnished us with a satisfactory verification of the accuracy of the instrument. In order to carry out the tests, the instrument was connected to a pair of 10-ohm even ratio coils, which were supplied for use on the Nalder type of Carey-Foster bridge. A trace of several hours was thus obtained, which was a straight line, free from any of the small waves or changes which were shown in the trace of the leads. A one-ohm sub-divided resistance box was then inserted on one side and $2/10$ ths of an ohm put in the circuit. A trace of several hours was obtained, similar in every way to the previous trace, but separated four divisions of the scale to one side. $4/10$ ths of an ohm were then put into the circuit and a third trace obtained, for several hours. The resistances were then removed from the circuit and the first trace repeated. This showed that $4/10$ ths of the large divisions on the scale correspond to .02 ohm, the large divisions being divided into $1/5$ ths. The resistance of the thermometers was 9.264 ohms at zero, which gives a change in resistance, per degree Fahren., of .020 ohm. As two small divisions of the scale correspond exactly to .02 ohm, this gives a sensitiveness of two small divisions of the scale, or $2/10$ ths of an inch, for one degree Fahren. difference between the two thermometers.

Tests of the zero were repeated later, after an interval of three months, and were found to correspond very closely.

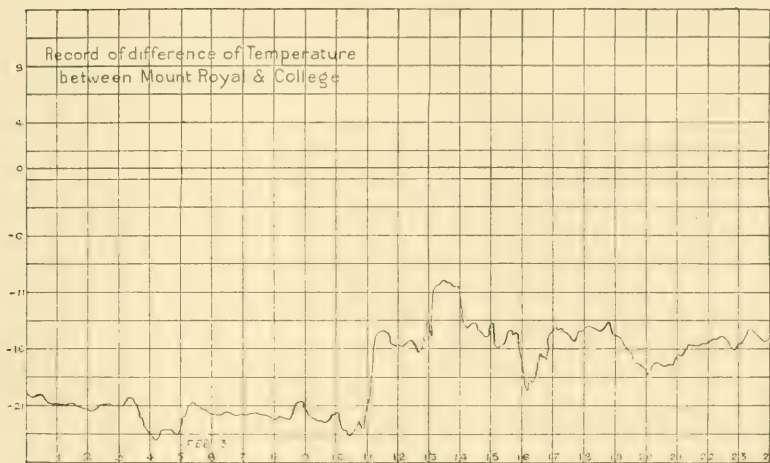
February 1st, 1904.



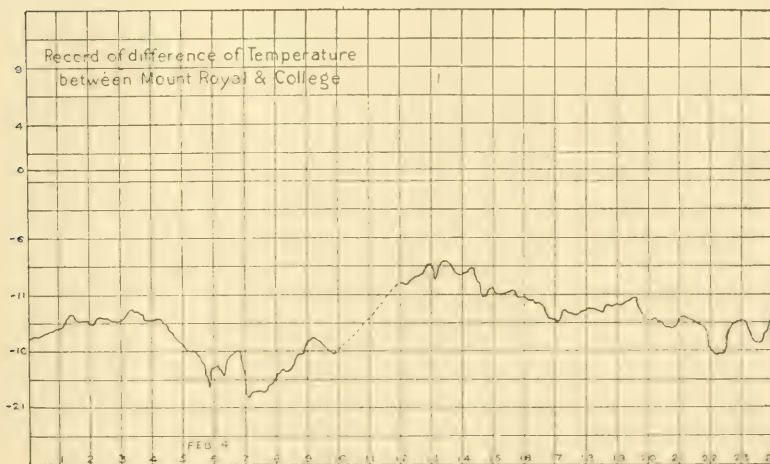
February 2nd, 1904.



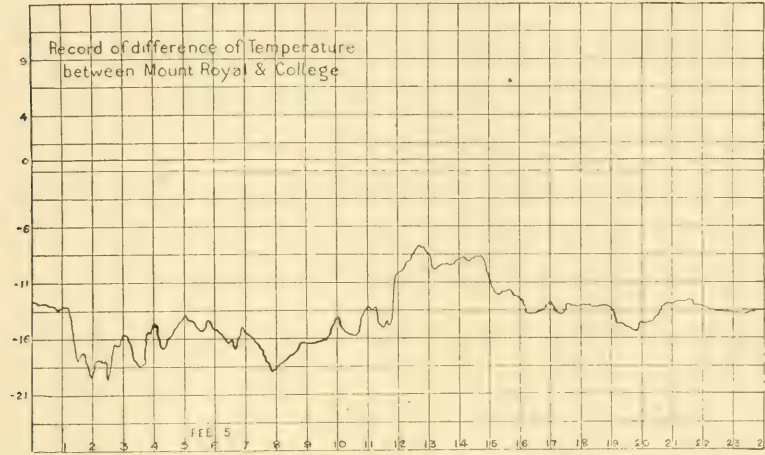
February 3rd, 1904.



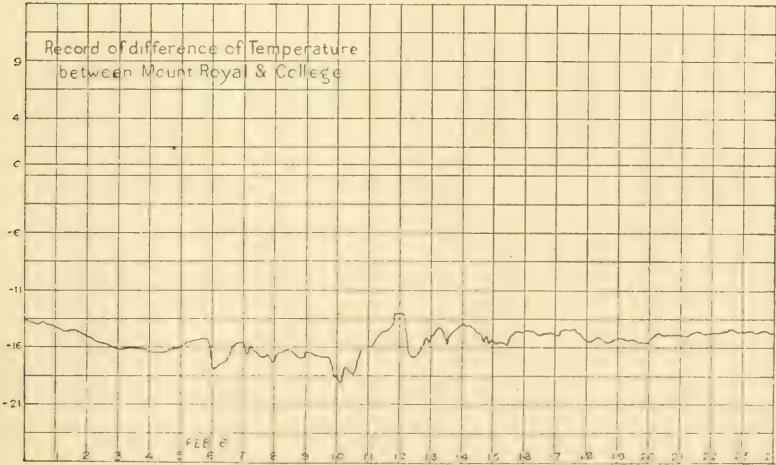
February 4th, 1904.



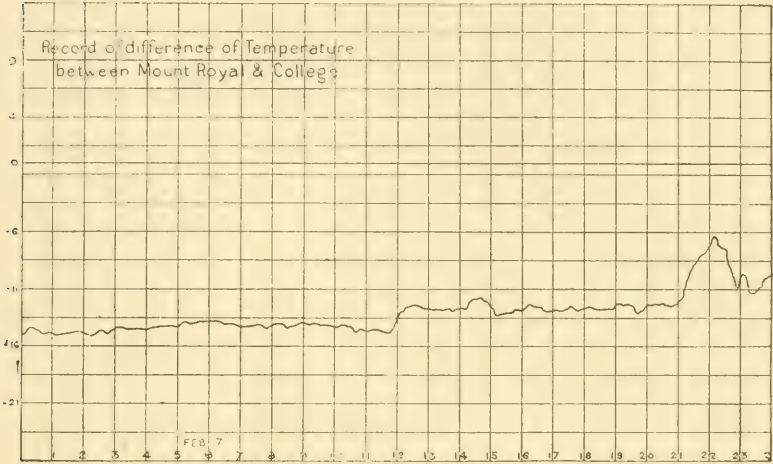
February 5th, 1904.



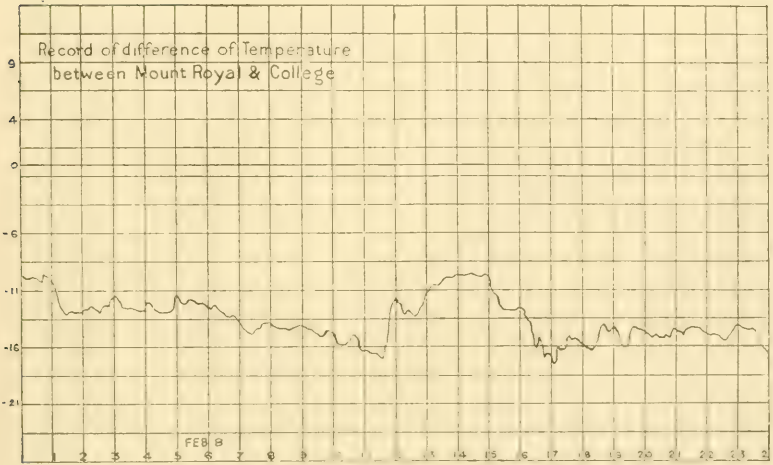
February 6th, 1904.



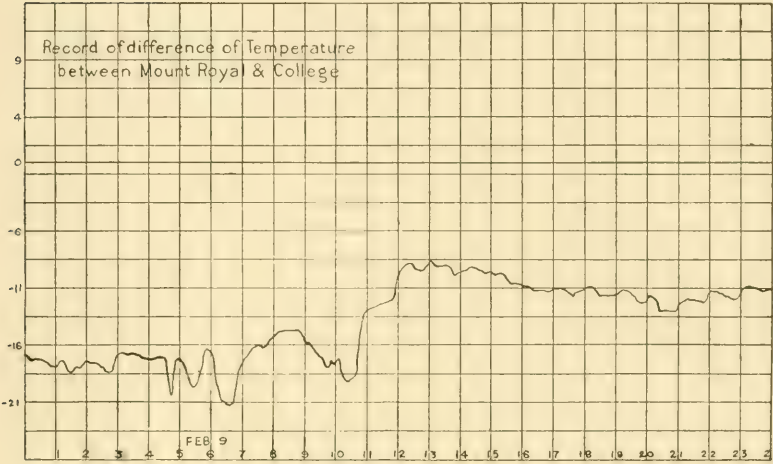
February 7th, 1904.



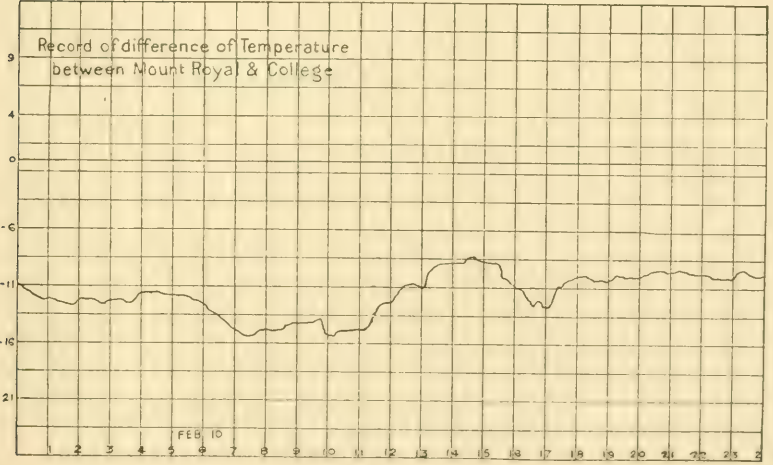
February 8th, 1904.



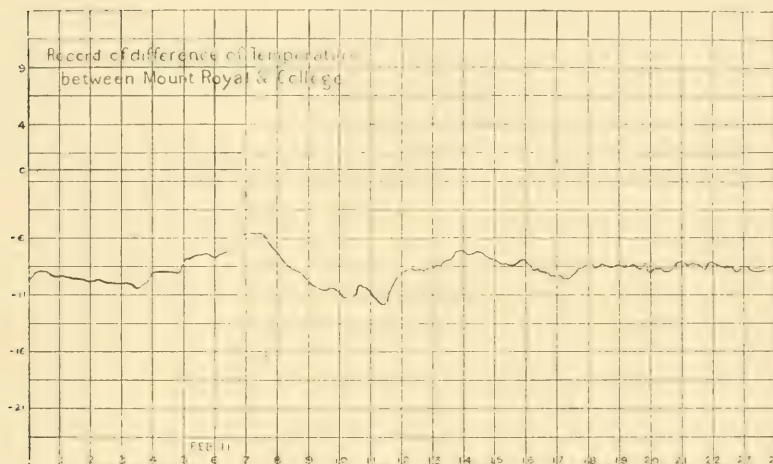
February 9th, 1904.



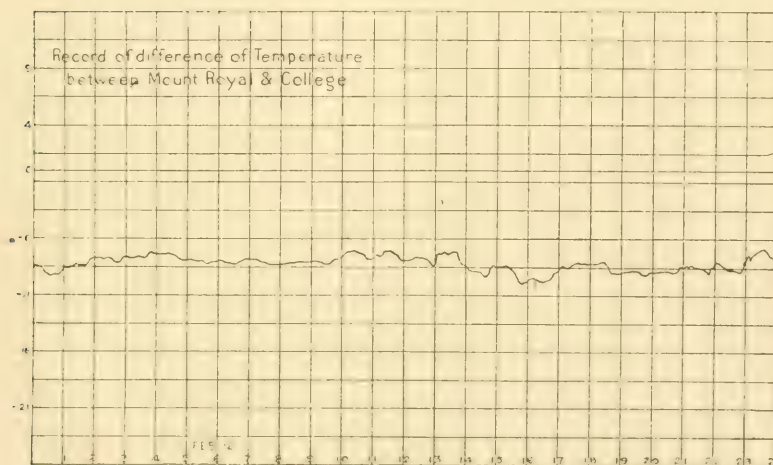
February 10th, 1904.



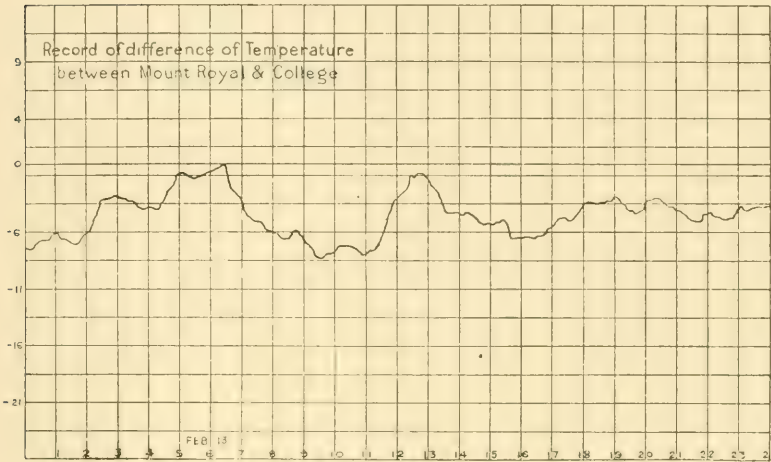
February 11th, 1904.



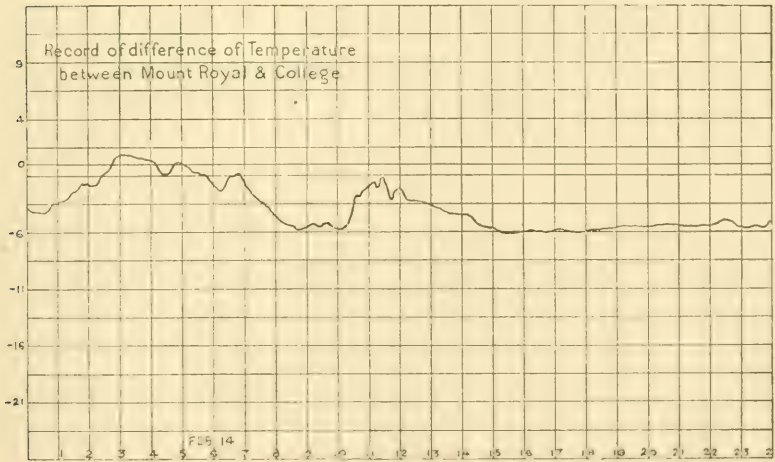
February 12th, 1904.



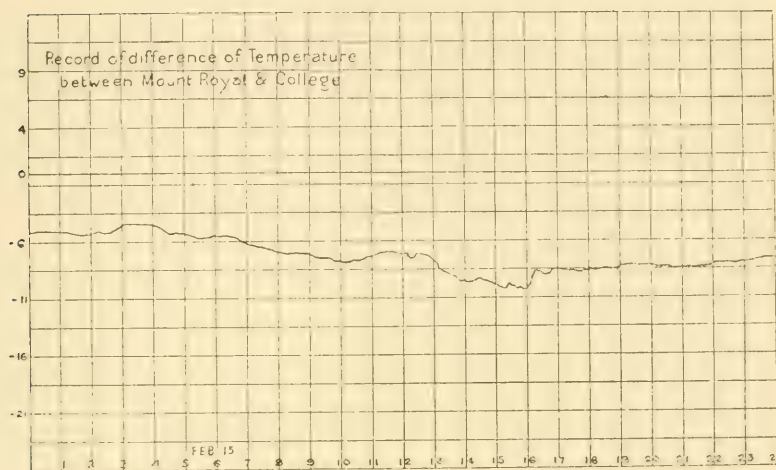
February 13th, 1904.



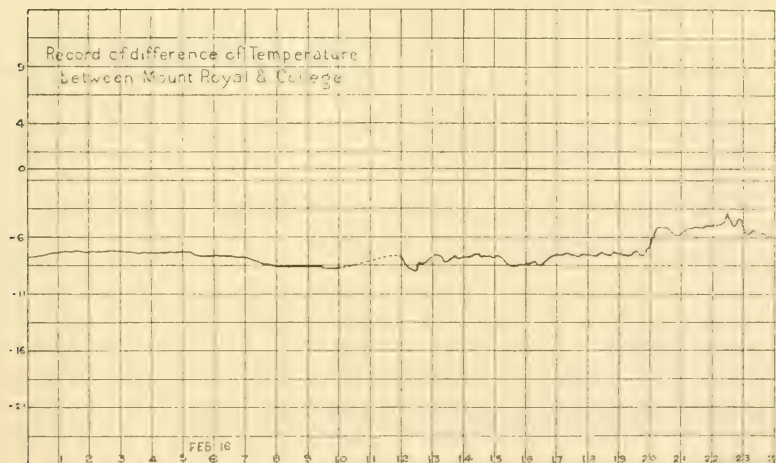
February 14th, 1904.



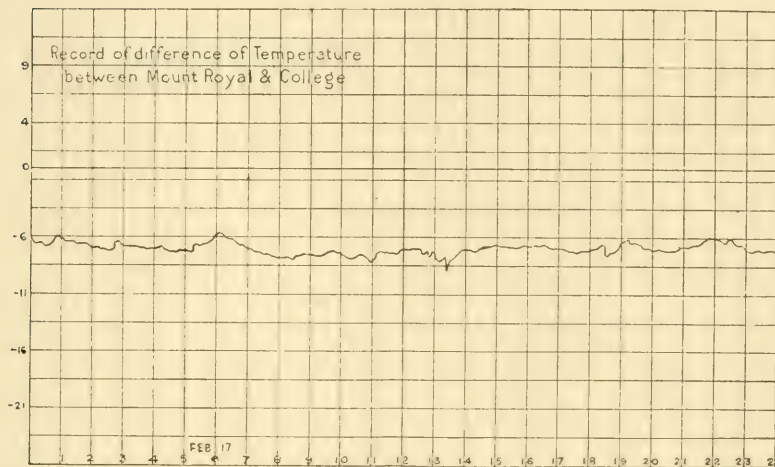
February 15th, 1904.



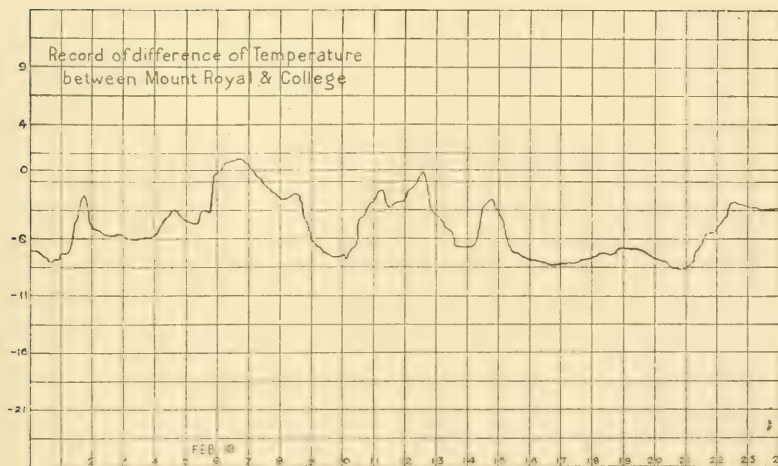
February 16th, 1904.



February 17th, 1904.

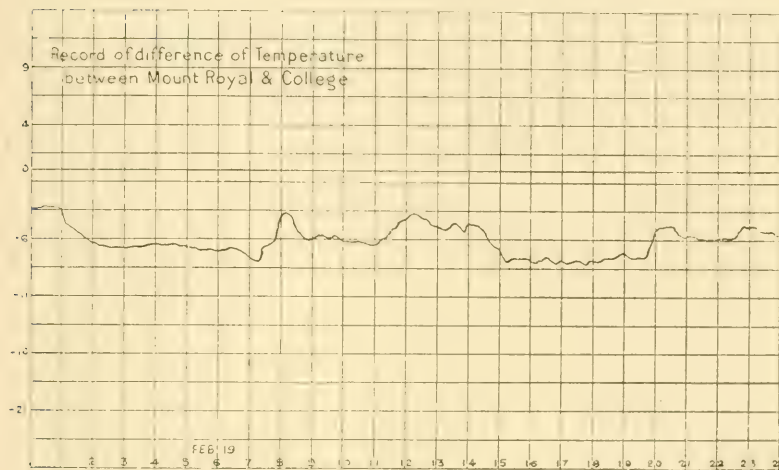


February 18th, 1904.

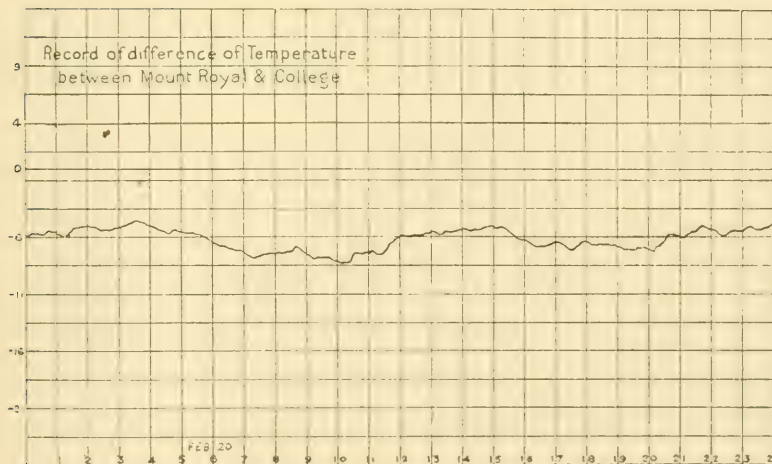




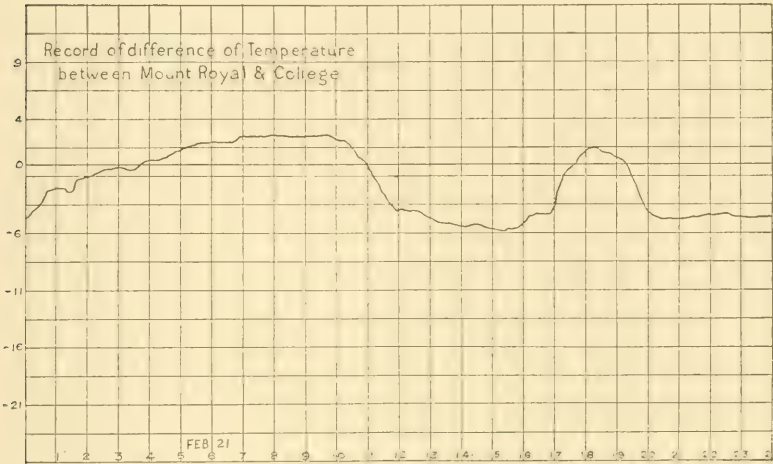
February 19th, 1904.



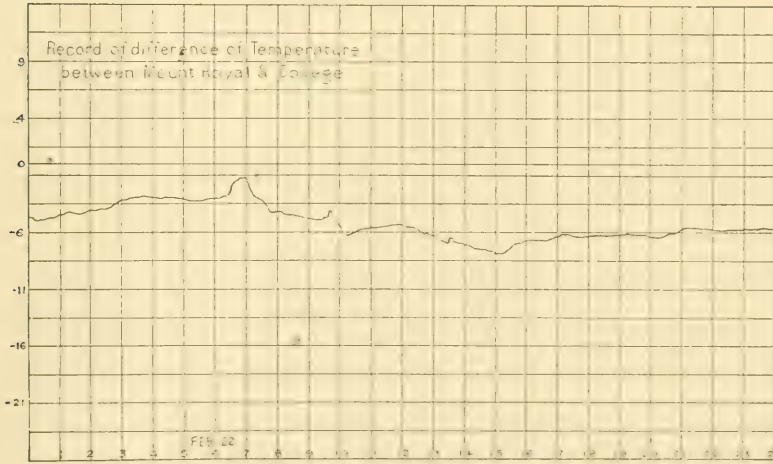
February 20th, 1904.



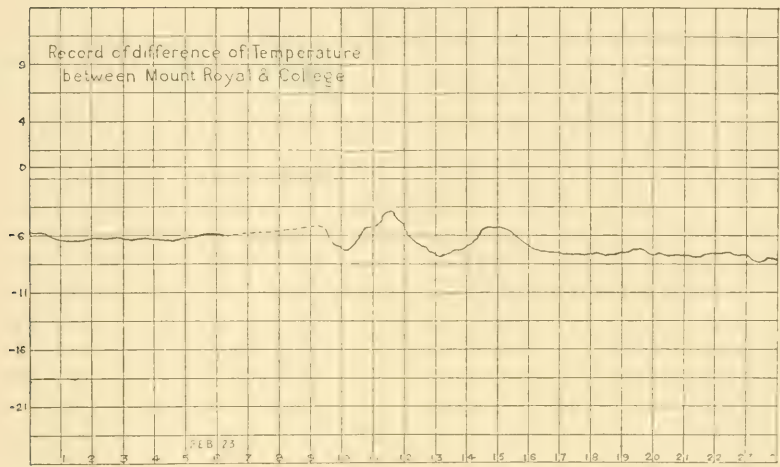
February 21st, 1904.



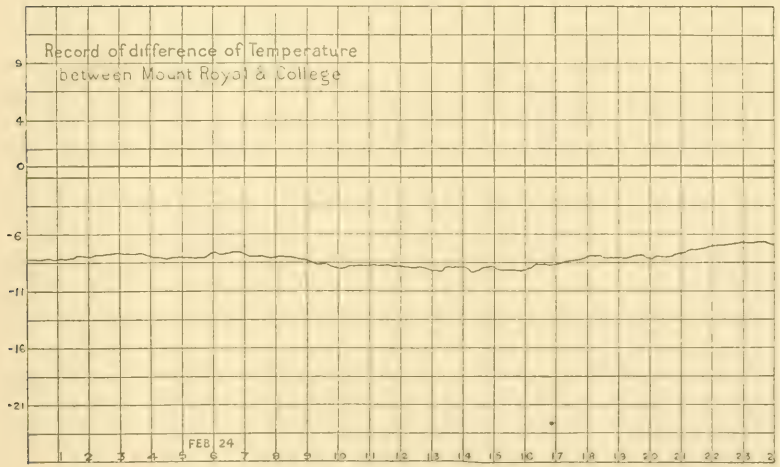
February 22nd, 1904.



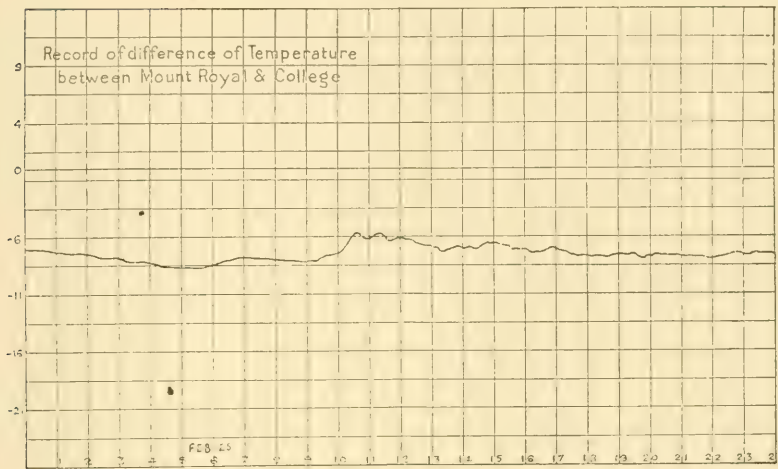
February 23rd, 1904.



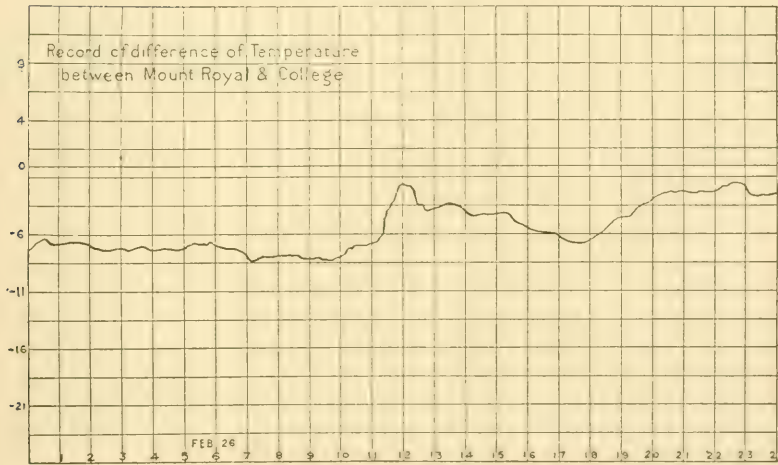
February 24th, 1904.



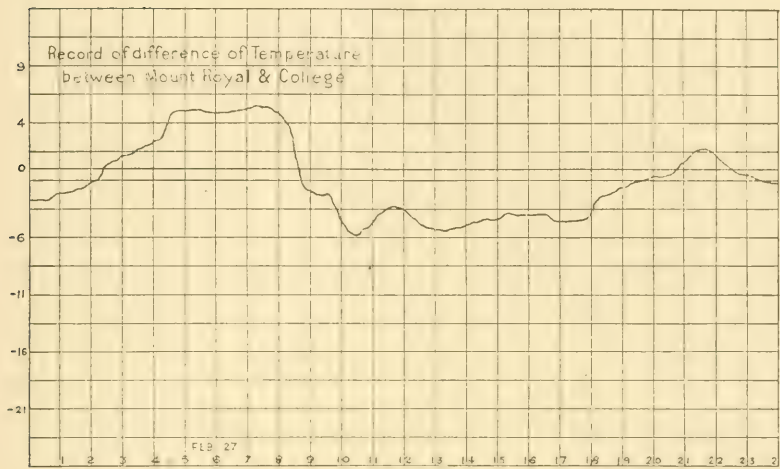
February 25th, 1904.



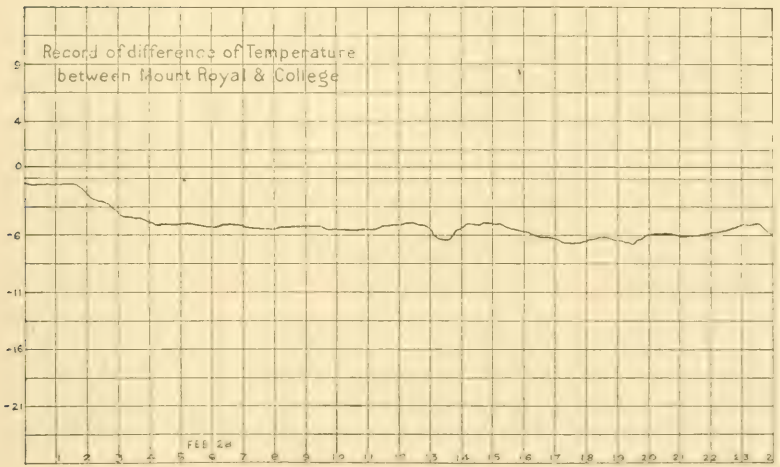
February 26th, 1904.



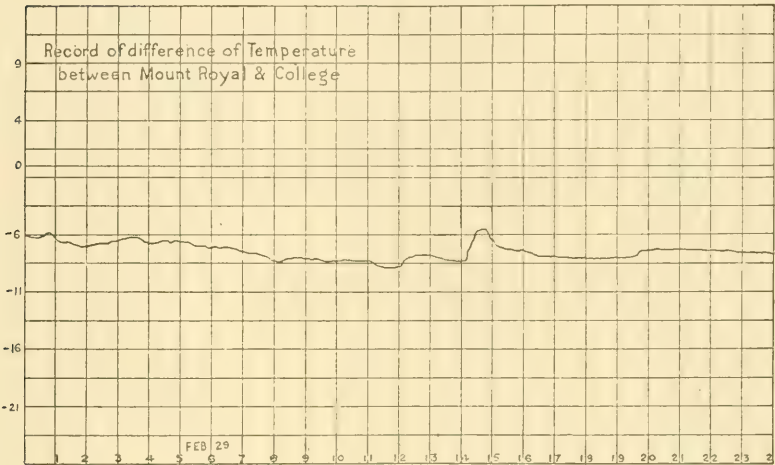
February 27th, 1904.



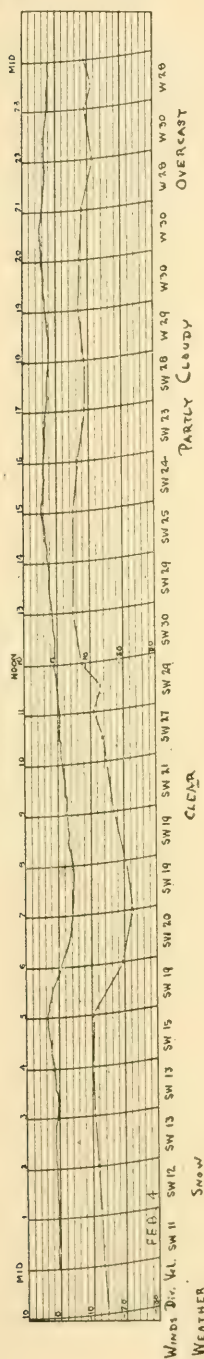
February 28th, 1904.



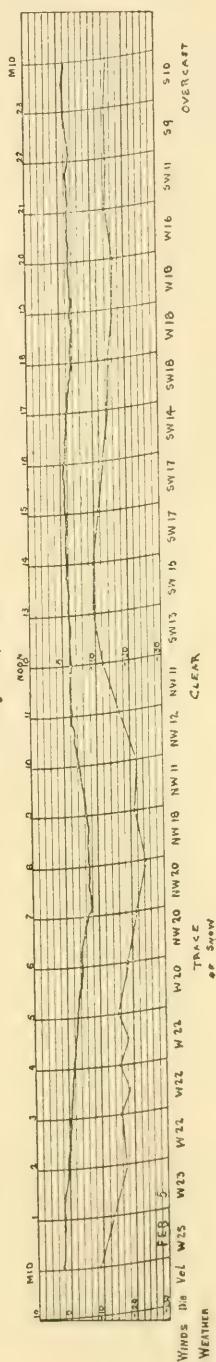
February 29th, 1904.



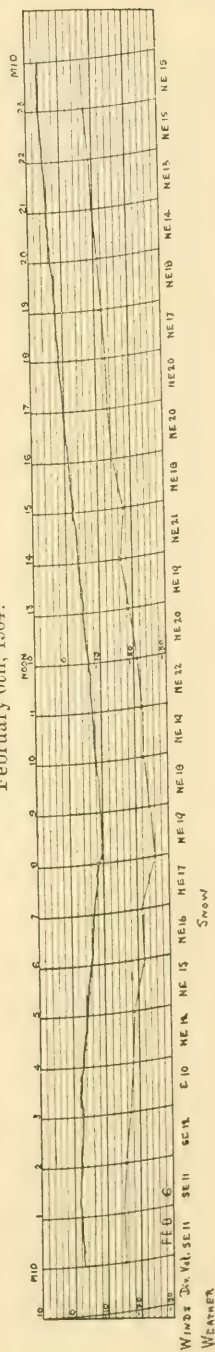
February 4th, 1904.



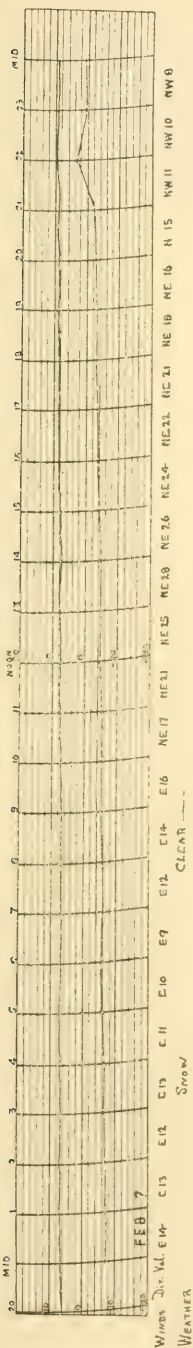
February 5th, 1904.



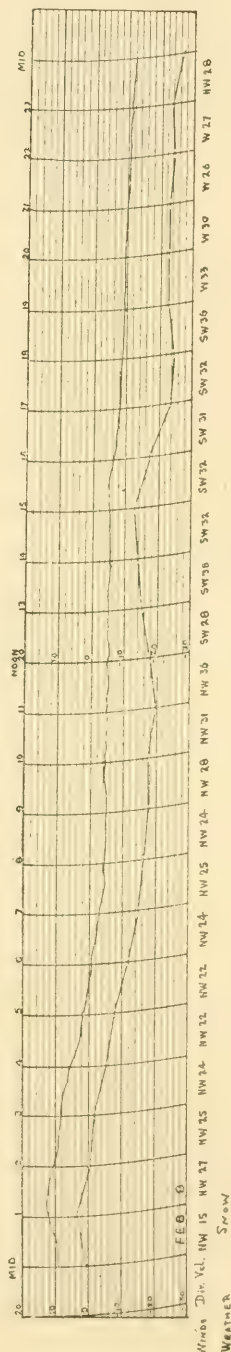
February 6th, 1904.



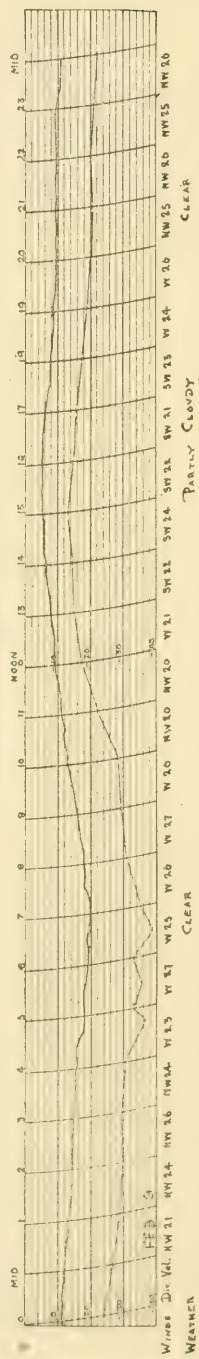
February 7th, 1904.



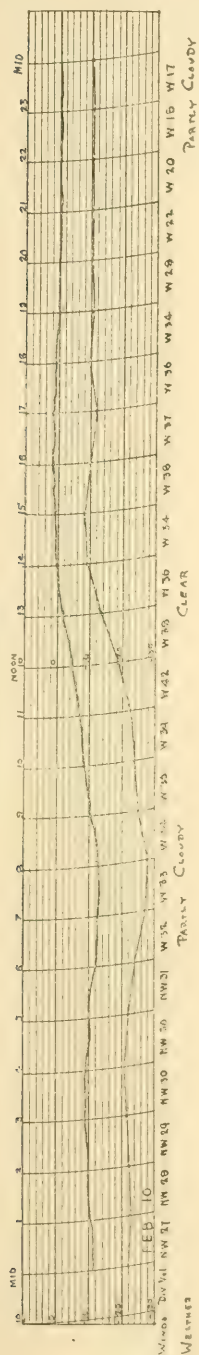
February 8th, 1904.



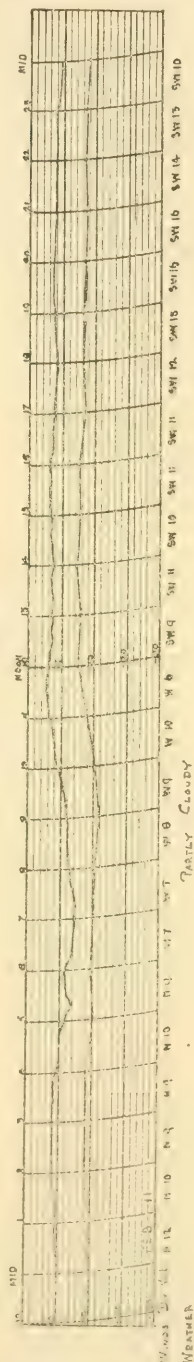
February 9th, 1904.



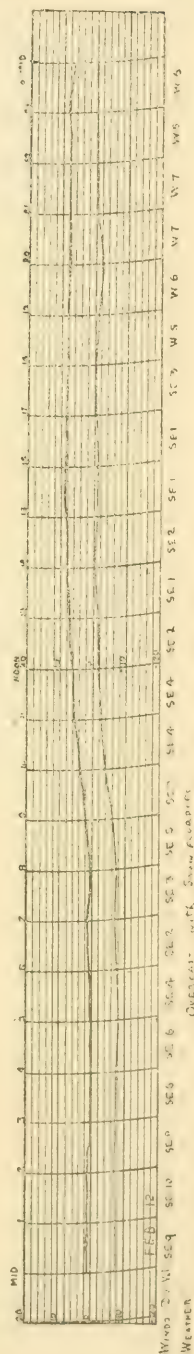
February 10th, 1904.



February 11th, 1904.

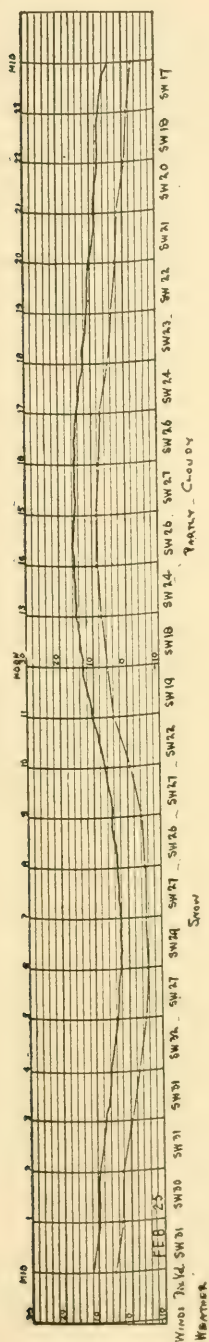


February 12th, 1904.

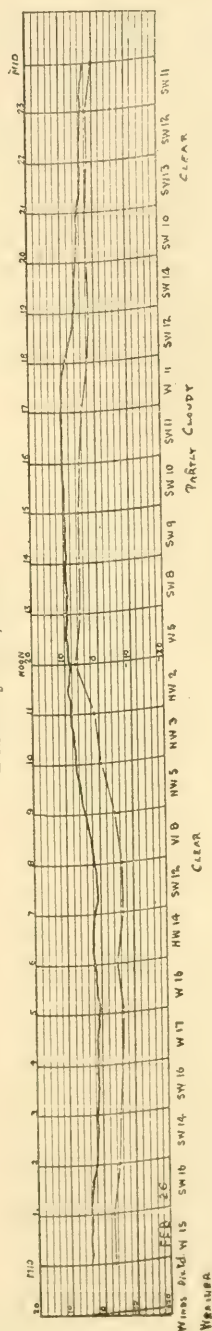




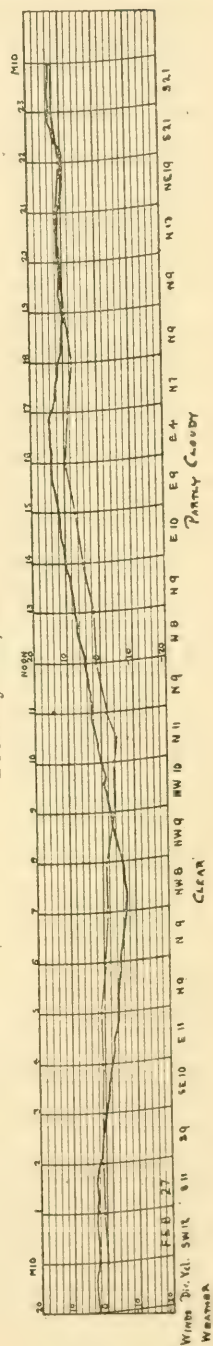
February 25th, 1904.



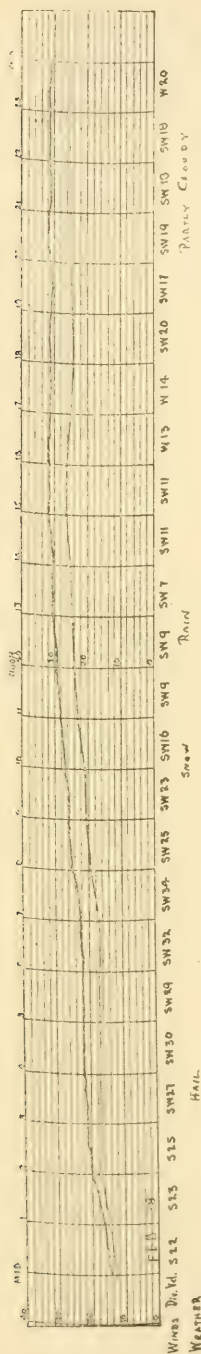
February 26th, 1904.



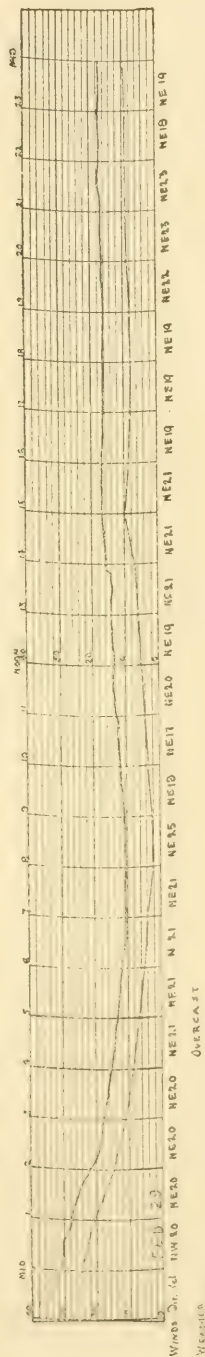
February 27th, 1904.



February 28th, 1904.



February 29th, 1904



XII.—*On the Backwater Produced by Weirs of Different Widths*

By HENRY T. BOVEY, LL.D., F.R.S.

(Read June 22, 1904.)

The present paper proposes to give an account of certain experiments made to determine the effect of obstructing a water-way by wing dams of varying widths. In the carrying out of these experiments a flume, 61 ins. in width, was used. The flume may be considered as a longitudinal slice of a water-way and the dimensions are given in units, which may be of any magnitude. Previous experiments, with models designed for hydraulic investigations on rivers and estuaries, carried out by many eminent hydraulic authorities, including Douglas, Unwin, Osborne Reynolds, Leader Williams, Deacon, Shelford, etc., indicate that important and reliable results may be obtained by the use of such models.

In the first and second series of experiments, two weirs, of the full width of the flume, namely, 61 units, were constructed, the one at the point of discharge and a second higher weir at 25 units from this point, the bottom of the flume being level. The portion of the flume between the two weirs was therefore of the character of a pond and any increase of depth at the discharge was necessarily accompanied by a corresponding increase of depth at the upper weir. The results of these experiments are shown on diagram I. from which the exact amount of back water due to the introduction of wing dams of 2, 4, 7, 7.6, 8, 10, 12, 18 to 24 units wide, can be at once measured.

For the third series of experiments, a false bottom, of approximately the same form as that of the River Ottawa between the Chaudiere Falls and the Little Chaudiere Falls, was constructed of grooved and tongued timbers, laid transversely, the clear width of the water-way being 53 units. Diagram II shows the results of this series of experiments. The increments of depth, due to the introduction of wing dams 6, 7.6, 12, 18 and 24 units in width, were determined at three points, namely, at the point of discharge and at distances of 4.2 and 15.2 units from this discharge. These increments are plotted on the diagram. Some difficulty was experienced in making accurate readings, owing to the rippling of the water caused by the irregularities of the bottom of the flume, but there were very definite indications that, for every given depth at the point of discharge, there was a limiting position in the bed of the water-way where back water would be produced by the introduction, at the point of discharge, of any obstruction, however small.

To verify this fact the fourth and fifth series of experiments were conducted, the bottom being now constructed of grooved and tongued planks laid with the joints in the direction of flow, which practically eliminated the rippling. A uniform slope was also given to the bottom, so that the water could escape with a maximum of freedom, while the tendency to produce backwater would be diminished to a minimum. Diagrams III. to X. show the results of these experiments, which in every case verified the statement, that when the bottom of the river at any given point A is at or below the level of the surface of the water at another given point B, further down the river, the introduction of any obstacle at B will produce backwater at A.

The highest point of the bottom of the Ottawa River between the Chaudiere Falls, designated A and the Little Chaudiere Falls designated C, is a ridge designated B, on which is constructed the O'Connor dam, Ring dam, etc. Thus between B and C the river is of the character of a deep pond and anything which affects the level of the water at B produces the same effect upon the level of the water at C. Further, the least depth of the water at the Little Chaudiere Falls in 1903 was found to be, at high water, about 10 ft., and the bottom of the river at that point, as well as at every other point at the foot of the Little Chaudiere Rapids, is below the level of the ridge at B. The results of the experiments show that as soon as the surface of the water at the brink of the Chaudiere is on a level with the bottom of the O'Connor dam, any obstruction however small, introduced at A, raises the level of the water at A and produces backwater at B, which again is reproduced at C, on account of the river between B and C being practically a deep pond. This holds true for the whole of the period during which the O'Connor dam is submerged and therefore any wing dam introduced at A must necessarily diminish the head available for power at the Little Chaudiere Falls. These results have also been verified by the previous experiments of eminent hydraulic authorities on other rivers.

The following tables give a summary of the measurements made, the measurements being in units:—

7TH MAY, 1903,

Width of wing dam....	0	6	7·6	12	18	24
Depth at point of discharge	·4	·42	·44	·50	·53	·62
Increment of depth at point of discharge....	....	·02	·04	·10	·13	·22
Increment of depth at 4' 2" from point of discharge.....	....	·0095	·01885	·0392	·07395	·1181
Increment of depth at 15' 4" from point of discharge.....	....	·00085	·0017	·0052	·010	·02845
Per cent. change of velocity.....	....	7·4	6·1	3·4	14·4	18

7TH MAY, 1903.

Width of wing dam....	0	6	7·6	12	18	24
Depth at point of discharge	·5	·51	·53	·58	·62	·75
Increment of depth at point of discharge....	....	·01	·03	·08	·12	·25
Increment of depth at 4' 2" from point of discharge .....	....	·0174	·02255	·04665	·0915	·14745
Increment of depth at 15' 4" from point of discharge.....	....	·0027	·0033	·0062	·0167	·0417
Per cent. change of velocity.....	....	10·5	10·1	11·4	22·1	21·8

7TH MAY, 1903.

Width of wing dam....	0	6	7·6	12	18	24
Depth at point of discharge	·77	·83	·85	·95	1·05	1·25
Increment of depth at point of discharge....	....	·06	·08	·18	·28	·48
Increment of depth at 4' 2" from point of discharge.....	....	·0446	·0658	·1192	·2032	·3183
Increment of depth at 15' 4" from point of discharge.....	....	·0067	·023	·0343	·0886	·1813
Per cent. change of velocity.....	....	4·6	5·8	4·8	11	12·6

Sec. III., 1904. 9.

8TH MAY, 1903.

Width of wing dam....	0	6	7.6	12	18	24
Depth at point of discharge.....	.43	.48	.50	.53	.57	.67
Increment of depth at point of discharge....	....	.05	.07	.10	.14	.24
Increment of depth at 4' 2" from point of discharge.....	....	.00325	.0295	.05145	.0968	.13365
Increment of depth at 15' 4" from point of discharge. ....	....	.00075	.0012	.0031	.01555	.034925
Per cent. change of velocity.....	....	1.02	.39	5	14.2	17.3

8TH MAY, 1903.

Width of wing dam....	0	6	7.6	12	18	24
Depth at point of discharge.....	1.32	1.47	1.50	1.70	1.82	2.20
Increment of depth at point of discharge....	....	.15	.18	.38	.50	.88
Increment of depth at 4' 2" from point of discharge.....	....	.134	.18635	.3235	.5222	.7724
Increment of depth at 15' 4" from point of discharge.....	....	.02525	.1018	.1363	.28575	.5012
Per cent. change of velocity.....	....	1.3	2.7	.4	9.8	9.6

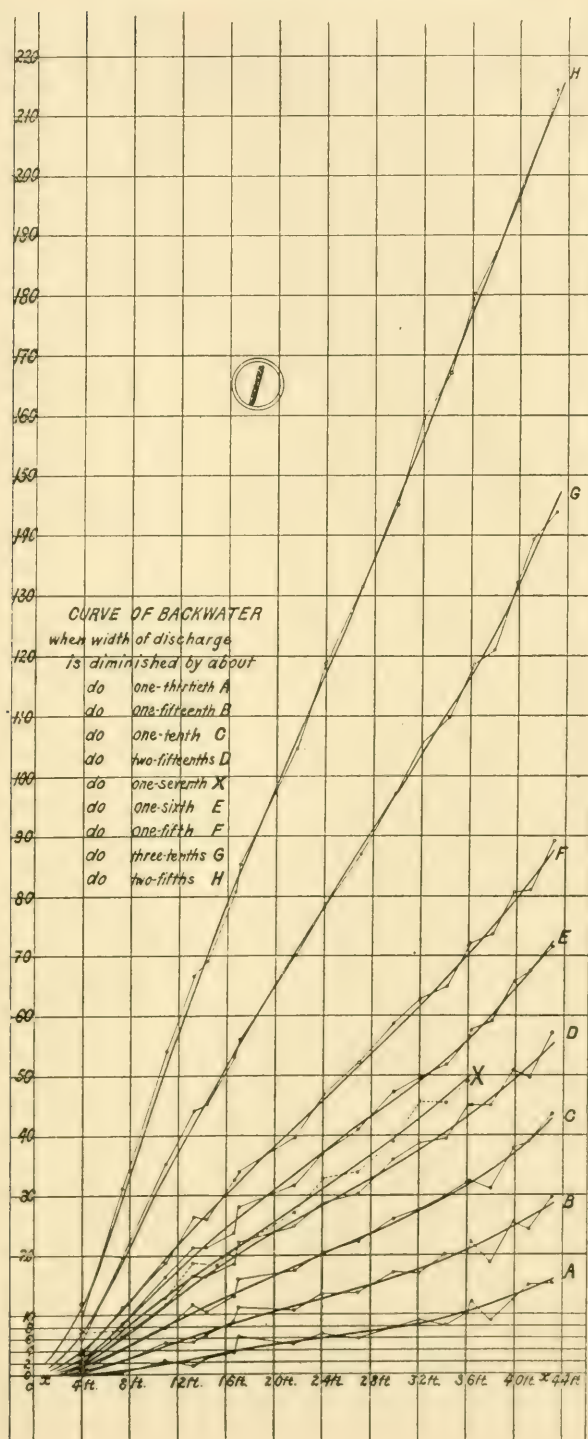
11TH MAY, 1903.

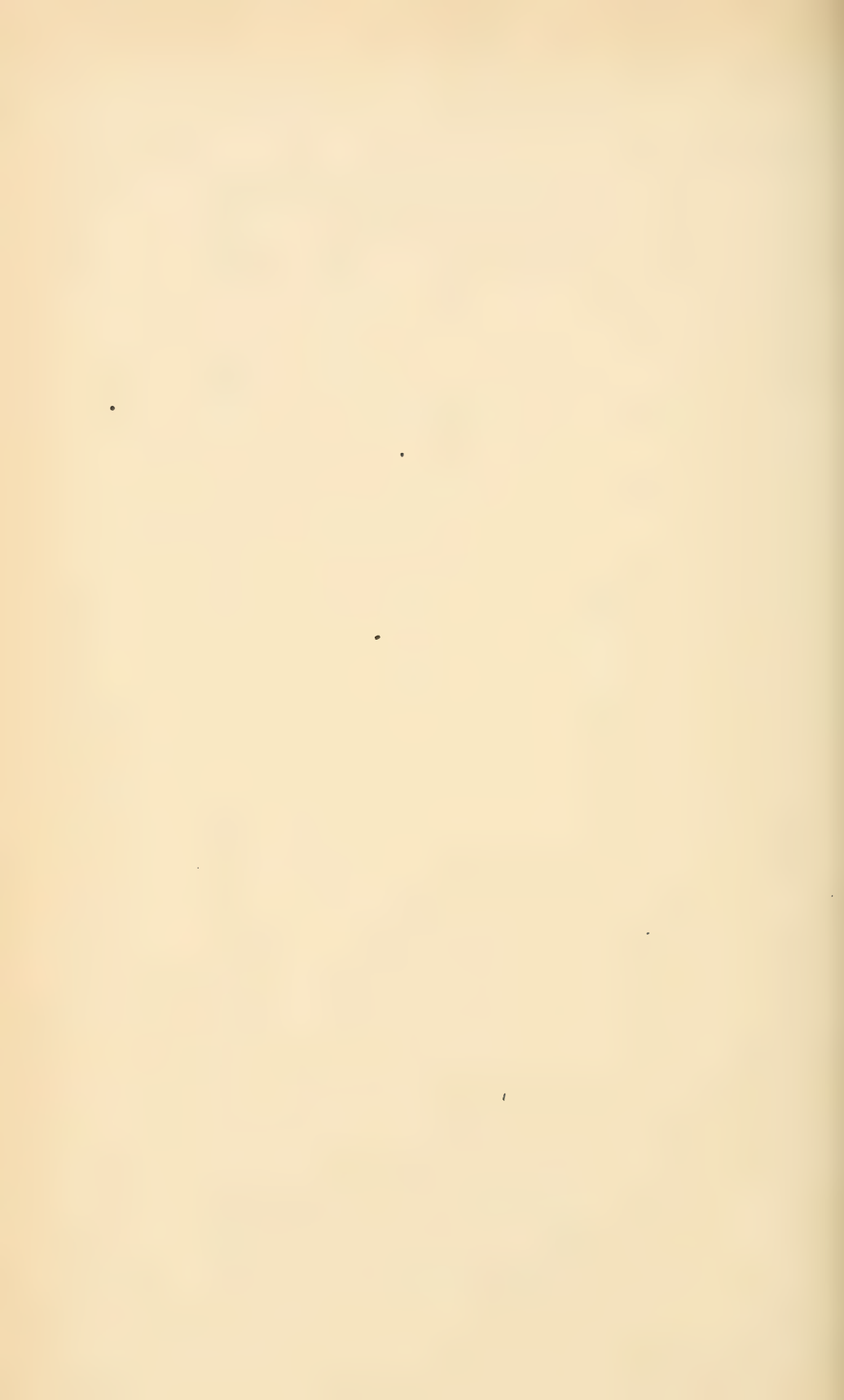
Width of wing dam....	0	6	7.6	12	18	24
Depth at point of discharge.....	.55	.58	.62	.70	.75	.85
Increment of depth at point of discharge....	....	.03	.07	.15	.20	.30
Increment of depth at 4' 2" from point of discharge.....	....	.0279	.03162	.0628	.11835	.1917
Increment of depth at 19' from point of discharge.....	....	.0007	.00328	.00465	.0113	.0491
Per cent. change of velocity.....	....	6.9	3.5	1.56	11	18.2

must necessarily be reproduced at C. When this water surface rises to the top of the O'Connor dam, the depth of the water at the Chaudiere Falls is between 13 and 14 ft., and there is consequently produced at B 13 ins. of backwater, which is again reproduced at C.

On April 15th, 1902, the water surface was that shown by the line EF and the depth of the water at A was about 20 ft. The experiments show that the building of the dam in question must then have produced at least 20 ins. of backwater at B and therefore also at C.

Another important point to note is the fact that the building of the dam at A produced backwater sooner than if the discharge had been left free, and thus the effective depth available for power purposes at the Little Chaudiere Falls is diminished for a proportionately longer period.





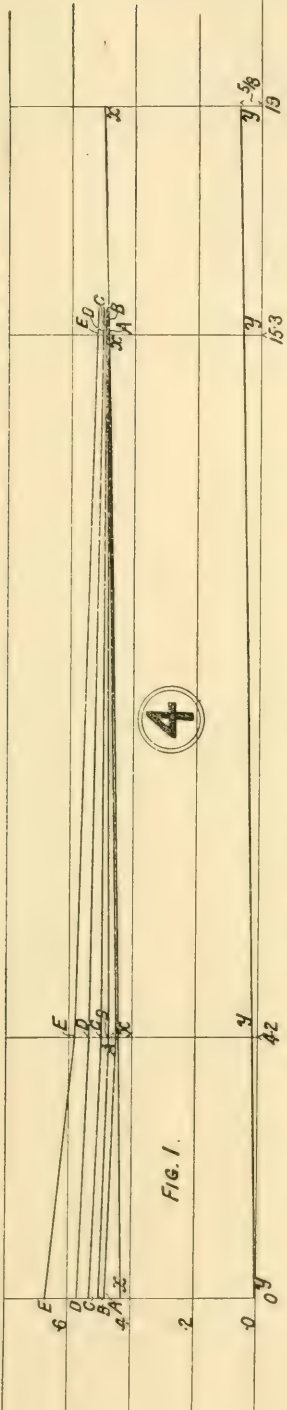


FIG. 1.

Diagrams showing change in surface level due to the introduction of Wing Dams 6, 7, 6, 12 and 24 wide when the initial depth is 43 (Fig. 1), and 4 (Fig. 2), of the discharge, for the full width of 53.

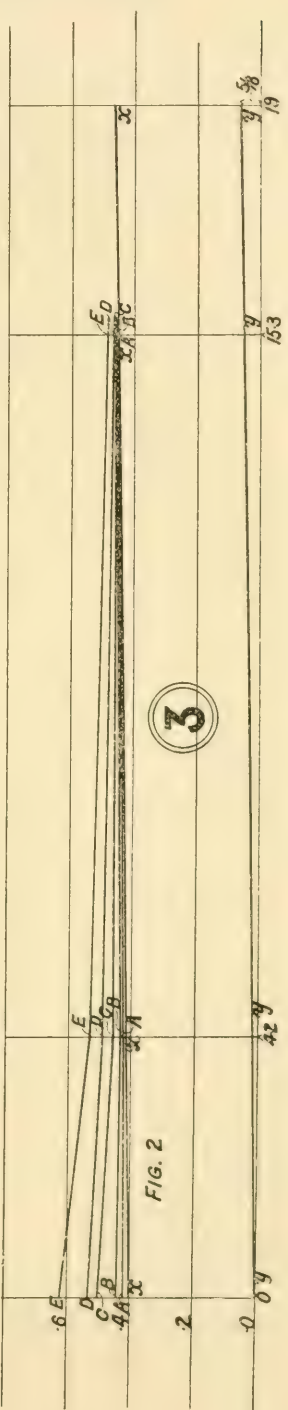
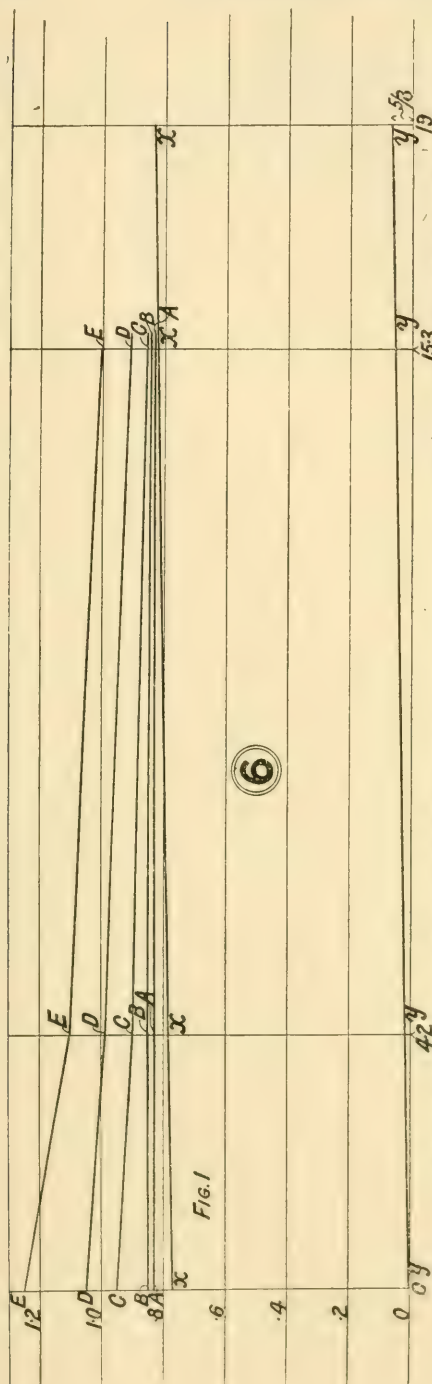
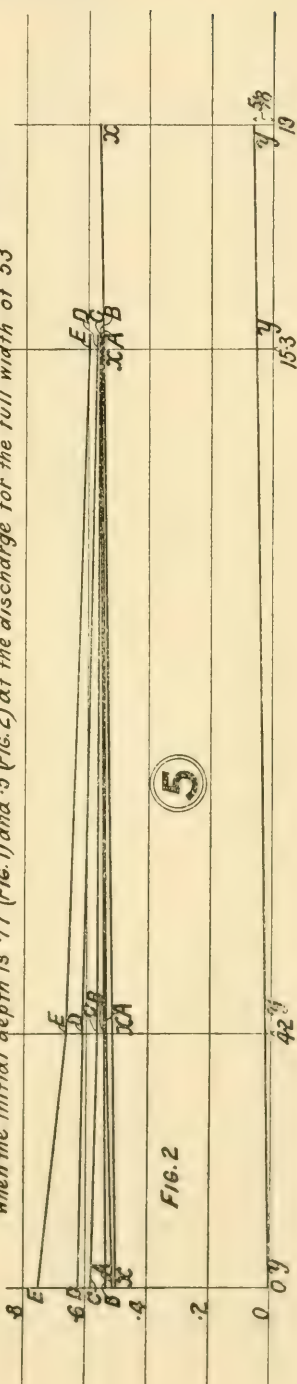
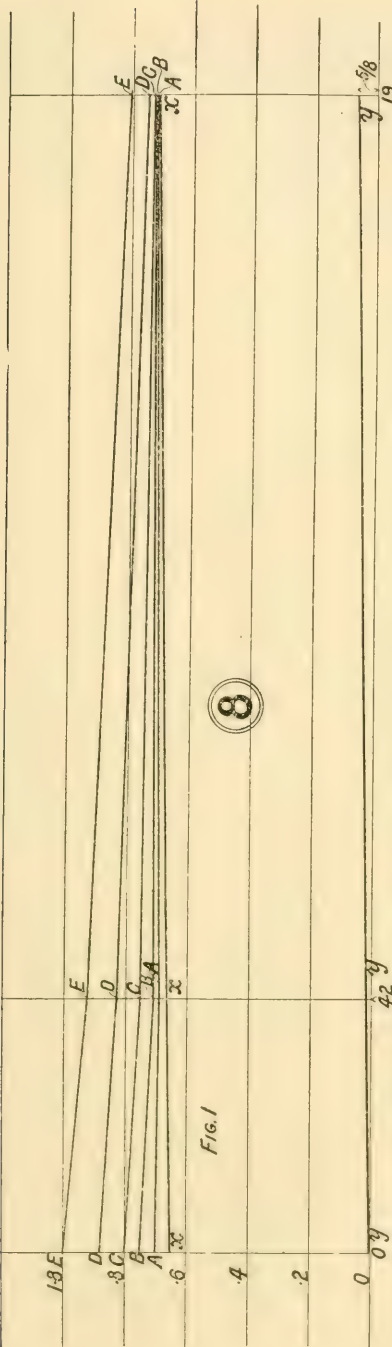


FIG. 2.

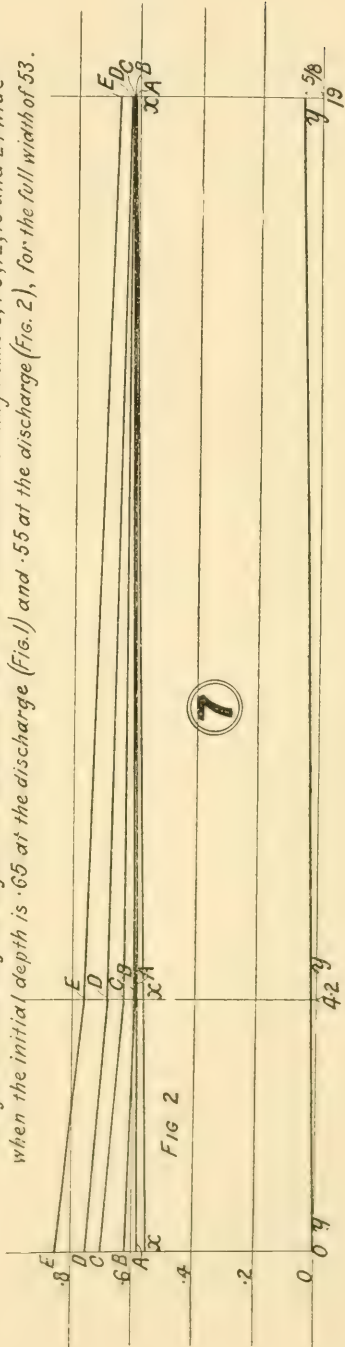


Diagrams showing change in surface level due to the introduction of Wing Dams 6, 7, 6, 12, 18 & 24 wide when the initial depth is .77 (Fig. 1) and .5 (Fig. 2) at the discharge for the full width of 53





Diagrams showing change in surface level due to the introduction of Wing Dams 6, 7, 8, 12, 18 and 24 wide when the initial depth is .65 at the discharge (Fig. 1) and .55 at the discharge (Fig. 2), for the full width of 53.



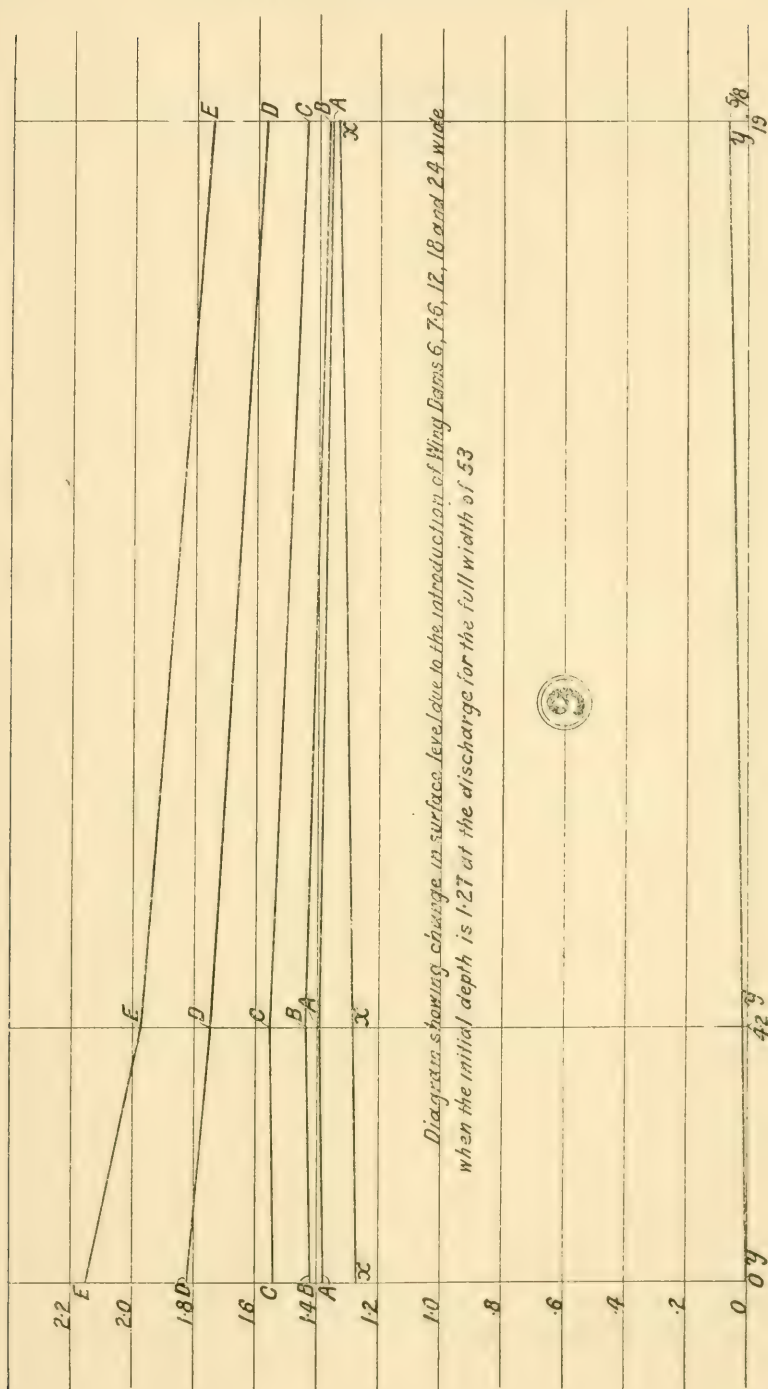




Diagram showing change in surface level due to the introduction of Wing Dams 6, 7, 6, 12, 18, and 24 wide, when the initial depth is 1.32 at the discharge for the full width of 53

10

4.29

15.3

ROYAL SOCIETY OF CANADA

TRANSACTIONS

SECTION IV.

GEOLOGICAL AND BIOLOGICAL SCIENCES

PAPERS FOR 1904

I.—On the squamoso-parietal crest of the horned dinosaur *Centrosaurus apertus* and *Monoclonius canadensis*
from the Cretaceous of Alberta.

By LAWRENCE M. LAMBE, F.G.S.

(Read June 22, 1904.)

Monoclonius dawsoni and *M. canadensis* were described by the writer in 1902 in part II of volume III (quarto) of Contributions to Canadian Palæontology¹ from material derived from the Belly River series of Red Deer river, Alberta. The specimens on which the former species was founded consist of an imperfect skull (Cat. No. 1173), figure 14, p. 58, op. cit., and a posterior crest with a nasal horn core (Cat. No. 971), figure 15, p. 59, op. cit. These remains were thought to belong to the same species, but it has since become evident that the separate posterior crest and horn core belong to a distinct species and probably also to a different genus. As the skull was referred to first in the original description and, although poorly preserved, supplies information regarding a number of the cranial elements, it is retained as the type of *Monoclonius dawsoni*. For the form represented by the posterior crest the writer has proposed² the generic name of *Centrosaurus* in allusion to the remarkable inwardly directed hook-shaped processes springing from the posterior border of the frill. The species has been designated by the name *apertus* in reference to the very large openings or fontanelles lying wholly within the parietal expansion.

In *Monoclonius canadensis* the openings in the posterior crest are bounded on the outer side by the squamosals as well as by the parietals and are probably even proportionally larger than those of *Centrosaurus*.

The crests of these two Ceratopsids are so remarkable in their structural characteristics that it is thought desirable to refer to them at the present time at greater length than was possible when originally described, and to provide figures for the better illustration of the specimens.

The crest or frill of *Centrosaurus* is composed mainly of the coalesced parietals which form an expansion broader than long and decidedly saddle-shaped, with a large opening on either side of the longitudinal axis. The parietal expansion, for the purpose of description, may be said to consist of a longitudinal central or axial part, a transverse portion forming the posterior border, and lateral or alar extensions that complete the sides and front margin. The central portion is comparatively broad, is high in front, concave in a longitudinal direc-

¹ On Vertebrata of the Mid-Cretaceous of the Northwest Territory.

² The Ottawa Naturalist, Vol. XVIII, pp. 81-84, plates I and II, July, 1904.

tion, and transversely convex on the upper surface, a rounded ridge being thus formed that extends backward to near the posterior border. From here an abrupt lateral extension of the bone to either side as a robust transverse bar, concave in outline behind when seen from above, constitutes the hinder margin from which are thrown off, at some distance on either side of the median line, the robust hook-shaped inwardly directed processes that form so prominent a feature in the general appearance of the crest. The posterior bar continues outward and forward on either side as relatively thin, narrow extensions, which, finally curving in to join the axial part anteriorly, completely enclose the large fontanelles. These alar extensions slope downward at a considerable angle, about 25° , on each side, and in an antero-posterior direction



partake, though in a less degree, of the longitudinal concavity of the median ridge. Along the median line the bone gradually thickens backward until a maximum thickness of six centimetres is attained at the centre of the posterior border. In the following figure, which represents the crest, as seen from above, one-eighth the natural size, the thickness of the bone in different parts is indicated in centimetres. From this it will be seen that the crest is decidedly robust behind, and that the bone gradually thins toward the front. The posterior bar near the median line presents a backwardly directed vertical face, which becomes rounded and less robust in the neighbourhood of the hooked processes; it is not, however, quite bilaterally symmetrical, its transverse section near the left hooked process being nearly

circular, whilst in the corresponding position on the other side it is decidedly thickened next to the fontanelle. Elsewhere the bone forming the margins of the fontanelles is thin, and comes gradually to a sharp edge. The right outer side of the crest is regularly scalloped from near the hooked process forward to a point almost in line with the front end of the fontanelle, from which point the squamosal suture extends forward and inward for some distance, as indicated in figures 1 and 2, and in the text figure, at *a*. The five protruding portions of the outer undulating margin bear sharp-edged epoccipital bones, with the exception, apparently, of the anterior one, which was partially in contact with the squamosal. The epoccipitals decrease in size forward and appear to have been firmly coössified with the underlying bone, the foremost one of the four, however, still showing the line of junction clearly. They lie in the general plane of the alar extensions, with their greatest diameter in an antero-posterior direction. Between them the bone is regularly emarginated and is evenly rounded at the edge. The coössification of the epoccipitals with the bone beneath would indicate an animal of mature age. The hooked processes appear to be a special development of the epoccipital bones and are of so extraordinary a nature as to demand special attention. Anteriorly the postfrontal suture, *b*, figures 1 and 2, and text figure, extends forward from the inner side of the front end of the fontanelle, in a general direction parallel to that of the squamosal, round the front end of the elevated axial ridge to meet the suture from the other side in the median line. The coalesced parietals extended beneath the postfrontals and squamosals as is indicated by the smoothness of the upper surface of the bone and its increased thinness in front of the groove or step marking the back limit of the sutural contact. At the extreme anterior end of the crest two vertical flanges of bone, one on each side of the median line, separate a deep central depression from lateral ones of about equal depth and size. Behind these latter occur smaller but deep pits that run beneath the edges of the elevated median ridge: these two pits are cut off from the more anterior pair by stout buttresses of bone. These five depressions evidently provided an increased surface of contact between the parietals and the postfrontals, where the principal strain in the support of the crest probably came and where great strength with lightness was no doubt requisite. On the lower surface the axial portion for a short distance in advance of the transverse posterior bar is flat, but in front of this the bone, on account of its increasing thinness as the front of the crest is approached, conforms more nearly with the general form of the upper surface so as to be deeply hollowed out in a longitudinal direction below. The lower surface of the crest is smoother

than the upper surface, where numerous vascular impressions are conspicuous as indicated in the accompanying figures. The markings are accentuated and most numerous on and in the vicinity of the hooked processes and epoccipitals both above and below, and on the upper surface they extend along the axial part forward. A shallow groove, *g*, figure 2, more clearly shown on the right side of the specimen, extends on the anterior side of the posterior bar from the upper surface near the median line downward and then upward in a regular curve, ending at a point in advance of the base of the hooked process. Above this groove the face of the bar presents a broken surface. On the left side the corresponding groove is only faintly indicated, and the bone above it is intact.

Judging from the position and extent of its suture the squamosal was evidently a comparatively small bone.

The horn core found with the posterior crest of *Centrosaurus apertus* is apparently from the nasal region; it is straight and laterally compressed so as to be lenticular in transverse section, with a sharp angular edge to the front and rear, recalling the shape of the nasal horn core described by Cope in 1889 under the name *Monoclonius sphenocerus*. The specimen is thirty centimetres in length, with the tip missing, and the lower surface imperfect. The compression may be accentuated by distortion, although the fossil does not seem to have suffered at all in that way, nor is there any evidence of injury from pressure in the posterior crest. The surface is marked by numerous vascular impressions and one side is deeply fluted longitudinally as in figure 3.

Measurements.

	M.
Extreme length from anterior end of crest (imperfect), medially, to line touching posterior edges of specimen on either side	·616
Length on median line, from anterior end to posterior border..	·486
Semi-breadth of specimen on curve of under surface	·470
Semi-breadth of specimen horizontally	·439
Vertical drop of lateral edge of specimen below median line of upper surface at mid-length	·186
Antero-posterior diameter of fontanelle	·296
Transverse diameter of fontanelle	·248
Circumference of base of left posterior spur	·172

The conclusion to be arrived at is that *Centrosaurus apertus* had a broadly expanded squamoso-parietal crest composed mainly of the

¹ Horned Dinosaurs of the Laramie. The American Naturalist, vol. xxiii., p. 715, pl. xxxiii., figs. 2, 2a.

coalesced parietals, the squamosals being confined to the antero-lateral edge of, and taking but little part in the formation of, the frill. That the large oval fontanelles were included entirely within the parietal part of the expansion and that epoccipital bones were well developed, of which the hinder pair were greatly modified so as to form large hooks or spurs of bone on the hinder border. That a closely fitting integument was present, as is indicated by the many impressions of blood-vessels on the upper surface, with the probability that the projections of the periphery, at the sides and behind, were sheathed in horn.

The frill of *Monoclonius canadensis* is made known to us through the medium of a very perfectly preserved right squamosal and the forwardly directed terminal portion of the right lateral posterior extension of the parietal which may have borne some resemblance to the parietal bone, the only known part of the crest, of *Monoclonius belli*. In the type specimen of the latter species the posterior parietal bar is broken off at some distance on either side of the median line of the head and the more lateral parts that would correspond with the known piece of the parietal of *M. canadensis* are missing. The type material on which *M. canadensis* is based includes the squamosal (Cat. No. 1254 a) and the parietal fragment (Cat. No. 1254 b) above mentioned, with a nasal¹ bone (Cat. No. 1254 c), a supraorbital horn core (Cat. No. 1254 d), a ramus of the lower jaw (Cat. No. 1254 e), and an anterior dorsal vertebra (Cat. No. 1254), all of which were found together and presumably belong to the same individual. A maxilla (Cat. No. 285), a lower tooth (Cat. No. 187), a ramus of a lower jaw (Cat. No. 284), and a supraorbital horn core (Cat. No. 212) from the type locality are also mentioned or described in the original description and referred to this species.

The squamosal, figures 4 and 6, has the form of a moderately thin plate, roughly triangular in shape, the base of the triangle being in front, the apex pointing backward. The outer border is convexly curved in outline, comparatively thick, with an evenly rounded edge, the inner one is concave and sharp-edged. Both the upper and lower surfaces are smooth and few indications of vascular impressions are present. The outer border is undulating, more decidedly so toward the front than posteriorly, there being four well defined convex projections in front with two longer but less salient ones behind: its anterior termination is pointed. The front border has two deep emarginations in its outer half, within it is thin and irregular being the edge of the sutural surface of contact with the jugal and the postfrontal.

¹ Originally referred to as the jugal. The writer wishes to express his obligations to Mr. Hatcher, of the Carnegie Museum, Pittsburgh, to whom he is indebted for a better understanding of the true nature of this bone.

Viewed from below, or from the inner side, the squamosal is seen to be thin for a short distance inward from the inner border along three-fifths of its hinder length for the accommodation of the forwardly directed prolongation of the posterior parietal bar. A sudden thickening of the bone marks the outer limit of the surface of contact. A deep pit *c*, figure 6, in continuation of the outer and larger emargination of the front border, directed obliquely backward and inward, received an elongate conical process from the quadrate which in this manner effected a strong union with the squamosal. The narrow, raised surface, *d*, figure 6, beneath this pit marks the junction of the outer end of the exoccipital. This surface is broken and reveals the pit for the quadrate more clearly than it would otherwise be seen. Behind this and outward from the longitudinal depression for the parietal the bone is relatively and rather uniformly thick, its surface being undulating and smooth. The bone in advance of the pit for the quadrate and the anterior termination of the depression for the parietal is thin with the inner border bent abruptly downward and inward at some distance from the edge so as to form what may be referred to as a deep triangular excavation in the inner front portion of the squamosal. The inner front border of this excavation indicates that the squamosal here overlapped the post-frontal to some extent, the contact with the jugal being limited to a small surface exterior to this which would include the marginal pit shown in figure 4 at *e*. A shallow groove, *f*, figures 6 and 4, extends inward from the raised surface for the exoccipital to the inner border; in its inner course it turns backward, becoming narrower and deeper, and crosses the anterior end of the depression for the parietal obliquely, finally passing to the upper surface over the inner border and ending in the concavity shown at *h* in figure 4. The surface of the bone behind this concavity, as well as that in the neighbourhood of the well defined depressions or grooves toward the front end of the inner border (figure 4) is roughened as if for muscular attachment. Linear vascular impressions are present anteriorly as indicated in the same figure.

The anterior termination of the posterior bar of the parietal, shown in figures 5 and 7, is flat on the side next to the squamosal, and keeled on the lower side, the keel passing from the inner edge behind to the middle of its anterior end where it is most prominent. Beyond its contact with the squamosal it is slightly twisted, so as to accommodate itself more exactly to the general plane of the upper surface of the squamosal, and curves a little inward, but so little as to suggest a sudden bending inward of the bone more to the rear, or if the inward curve were gradual a very great backward development of the parietal portion of the crest along the median line of the head would be

necessary. In either case the fontanelle, lying on the inner side of the squamosal and the attenuated lateral extension of the posterior part of the parietal, must have been of considerable size, probably much larger than the fontanelles of the crest of *Centrosaurus apertus*. The undulations of the outer border of the squamosal are continued in that of the free part of the parietal (figures 4—7). The dotted outlines in figures 4 and 6 indicate the position of the parietal extension, when applied to the squamosal, and as it was found in the rock. The figures 7a, 7b and 7c give the outlines of transverse sections of the bone at the points indicated.

It is seen then that in *Monoclonius canadensis* the posterior crest extended far backward, that it was made up of the parietals (probably coalesced so as to have somewhat the form of the corresponding portion of the frill of *Monoclonius belli*) and the squamosals, the latter entering largely into the composition of the sides of the crest, and that fontanelles of very large size were present. We know also that the fontanelles were not included entirely within the parietals, as in *Centrosaurus*, but were bounded laterally in front by the squamosals.

Measurements of squamosal, etc.

	M.
Length on curve of outer border	·576
Length on curve of inner border	·573
Length from posterior end to centre of front margin	·533
Breadth across front margin	·355
Thickness near outer border, at mid-length	·028
Thickness near inner border, at mid-length	·038
Length of fragment of parietal extension	·502
Breadth of same at mid-length	·064
Greatest thickness of same at mid-length	·030

PLATE I.

Figure 1.—Coalesced parietals of *Centrosaurus apertus* as seen from above; one-eighth natural size.

Figure 2.—Right lateral aspect of the same; similarly reduced.

Figure 3.—Lateral aspect of nasal horn core of *C. apertus*; one-eighth natural size.

Figure 3a.—Outline of transverse section of the same, similarly reduced.

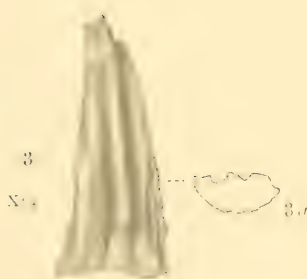


PLATE II.

Figure 4.—Exterior aspect of right squamosal of *Monoclonius canadensis*; one-sixth natural size.

Figure 5.—Upper surface of front end of right lateral posterior extension of parietal of *M. canadensis*; similarly reduced.

Figure 6.—Interior view of the squamosal shown in figure 4; similarly reduced. The dotted line in this figure and in figure 4 indicates the position of the parietal extension when applied to the squamosal.

Figure 7.—Lower surface of bone shown in figure 5; similarly reduced.

Figures 7a, 7b, 7c.—Outlines of cross sections of the same at the points indicated.

CREST OF HORNED DINOSAURS



II.—*The Progress of Vertebrate Palæontology in Canada.*

BY LAWRENCE M. LAMBE, F.G.S., OF THE GEOLOGICAL SURVEY OF CANADA.

(Read June 22, 1904.)

The dawn of vertebrate palæontology in Canada may be said to have begun when Sir William E. Logan, in 1841, discovered amphibian footprints in the Lower Coal Measures at Horton bluff, Nova Scotia. It may be naturally asked—What progress has been made in the science of vertebrate palæontology since that time, and what is the present state of our knowledge of the vertebrates that inhabited the northern half of this continent, living on the land, in the lakes and rivers, or in the adjacent seas, during past geological ages? It is with the object of reviewing briefly the progress of Canadian vertebrate palæontology during this period of over sixty years that the present paper is written.

The discovery by Sir William Logan of footprints at Horton bluff in 1841 was the first proof of the existence of Carboniferous air-breathing vertebrates. In a paper on the coal-fields of Pennsylvania and Nova Scotia, read by him before the Geological Society of London, shortly after, mention is made of the finding of these tracks, an abstract of the paper appearing in the *Proceedings of the Society* in 1842.¹

Sir J. William Dawson, in his "Synopsis of the Air-breathing Animals of the Palæozoic in Canada, up to 1894," refers to the leading part taken by our eastern provinces in some of the earlier discoveries, but it may be said that whatever credit is due in this regard to eastern Canada is the result, in a great measure, of the untiring energy and industry of Sir William Dawson himself. To him belongs the credit of having made the "first discovery of the osseous remains of any Palæozoic land vertebrate in America,"² when in 1850 he found the type of *Baphetes planiceps* at the Albion mines, Pictou. Sir William Dawson's contributions to vertebrate palæontology have been principally confined to the description of numerous species of Carboniferous Stegocephalia. Much of his time was devoted to palæobotany, as is evinced by his numerous writings on the fossil flora of this country published at frequent intervals during his long life. In his "Acadian Geology" will be found the results of years of arduous work, devoted to the eluci-

¹ *Proc. Geol. Soc., London, Vol. III., pt. II., p. 707.*

² *Synopsis of the Air-breathing Animals of the Palæozoic in Canada, up to 1894. Transactions Royal Society of Canada for 1894, vol. xii., section iv., p. 71, 1895.*

dation of the geology of the maritime provinces, and begun when the science of geology may be said to have been still in its infancy.

In the early fifties Dr. C. T. Jackson made known to us some of the fishes of the Lower Carboniferous of New Brunswick. To Sir Richard Owen we are indebted for the description of *Baphetes planiceps* and two other species of *Stegocephalia* from the Coal Measures of Nova Scotia.

Bathygnathus borealis, from the Triassic of Prince Edward island, one of the earliest of the Theropoda and the only known dinosaur from eastern Canada was described by Dr. Joseph Leidy in 1854.

Sir William Dawson's first edition of "Acadian Geology" appeared in 1855 and was followed in later years, from 1859 on, by numerous papers on the fishes and amphibians of the Carboniferous rocks.

The large vertebræ from the Coal Measures of Nova Scotia, discovered by Professor Marsh and named by him in 1862 *Eosaurus acadianus*, made known the existence of a Carboniferous Stegocephalian of large size. These remains were thought by Professor Marsh to represent an Ichthyopterygian reptile, but they have since been referred to the Labyrinthodontia with uncertainty as to their family relationship.

Professor E. Ray Lankester contributed in 1870 to our knowledge of the Lower Devonian Cephalaspids, having for his subject the remarkable form *Cephalaspis dawsoni*, from Gaspé, named after its discoverer Sir William Dawson.

Vertebrate palæontology in this country owes much to Professor E. D. Cope, who, when he could ill afford the time, was willing to give to us, in the cause of science, the benefit of his extensive knowledge of the vertebrata. His memoir on the fauna of the Oligocene beds of the Cypress hills was an important addition to the vertebrate palæontology of this continent.

Dr. J. F. Whiteaves has, between the years 1880 and 1889, in a number of papers, placed before us the results of his studies of the rich fish-faunas of Campbellton, N.B., and Scaumenac bay, Que. In two of these papers, read before this Society, the well-preserved specimens of *Bothriolepis canadensis* and the Upper Devonian Crossopterygian *Eusthenopteron foordi* are described and figured.

Dr. G. F. Matthew was the fortunate discoverer in 1886, in rocks of supposed Niagara age in New Brunswick, of the Ostracoderm *Cyathaspis acadica*. These remains, first described in 1886, and more fully characterized in a number of papers of later date, represent a form of vertebrate, the oldest yet discovered in Canada as regards its geological age. If the views of some authorities be accepted it may be

regarded as the most primitive example of vertebrate life known to us in this country.

Dr. A. Smith Woodward, in two papers published in the Geological Magazine in 1892, adds much to our knowledge of the Devonian fishes of Seamenac bay and Campbellton, and Dr. R. H. Traquair has also described new or little known forms from these same localities.

In association with Professor H. F. Osborn, the writer in 1902 reported on the vertebrate fauna of the Belly River series of the North West Territory, the publication taking the form of a joint memoir. Professor Osborn, in a manner as disinterested as that of Professor Cope, and equally laudable, devoted time, when under the pressure of other work, to the consideration of the general geological and palæontological relations of the fossils which the writer had the pleasure of describing. This fauna includes fishes, a batrachian, reptiles and mammals, the majority of which were new to science.

After having glanced at the main facts relating to the results of those who have contributed most to our knowledge of the fossil vertebrata of the Dominion, let us pass to a consideration of the faunas, as they are known to us at present, of the different geological horizons.

1. SILURIAN FAUNA.—In rocks of Silurian age there are only two representatives of the highest subkingdom, viz.: *Cyathaspis acadica*, an Ostracoderm from New Brunswick, belonging to the order Heterostraci, which includes the simplest forms of the subclass, and *Dendrodus arisaigensis*, a crossopterygian Teleostome from a slightly higher horizon in Nova Scotia. The former is the only Silurian Pteraspid known from Canada, a species of another genus, *Palæaspis elliptica*, occurring in the Upper Silurian of Pennsylvania. *Dendrodus arisaigensis* is based on a well-preserved tooth, from the Upper Arisaig series (Lower Helderberg) at McDonald's brook, near Arisaig, N.S., collected by Mr. T. C. Weston in 1869.

2. LOWER DEVONIAN FAUNA.—Passing to the Lower Devonian, the efforts of collectors have here been more liberally rewarded. Through the writings of Lankester, Whiteaves, A. S. Woodward and Traquair, the number of known species from these rocks is now greatly increased, in comparison with the paucity of the recorded species from the Upper Silurian, the majority of the forms coming from the celebrated beds at Campbellton, N.B. Three species of Cephalaspids are notable, *Cephalaspis campbelltonensis*, of which the cranial buckler, the only part preserved, is of large size, *C. dawsoni*, from Gaspé, remarkable in many ways, but especially in the great breadth of the head shield as compared with the smallness of the trunk, and *C. jexi*, differing in several particulars from both of the above species. In the class Pisces,

seven genera are represented by seven species. *Protodus jexi* and *Doliodus problematicus* are Pleuracanthids from Campbellton. Of the Diplacanthidæ we have *Climacodus latispinosus*, also from Campbellton, and of the Acanthodidæ there are *Acanthodes semistriatus* and *Cheiracanthus costellatus*, from the same locality. The Dipnoi are represented by a single species, *Phlyctenaspis acadica*, an Arthrodire generically distinct from *Coccosteus*, with which it was originally classed. Woodward has drawn attention to the presence in this species of a pair of hollow, lateral, fixed spines, a feature worthy of special notice. Another species of this order, *Macropetalichthys sullivanti*, is questionably represented by small fragments of plates from the Corniferous of Ontario. Of the Teleostomi a single Crossopterygian is indicated by part of an "inter-mandibular crest," from the Corniferous of Ontario, which has been identified with Newberry's *Onychodus sigmoides*. Under the designation Ichthyodorulites come *Machæracanthus peracutus*, *M. sulcatus* and *Gyracanthus incurvus* from Ontario, Gaspé and New Brunswick respectively.

3. UPPER DEVONIAN FAUNA.—The fauna of the Upper Devonian differs materially from that of the Lower Devonian by the introduction of many new forms. The order Osteostraci is represented by three species, the order Antiarchi by the very characteristic Upper Devonian genus *Bothriolepis*. The Elasmobranchs include Acanthodian fishes of the families of Diplacanthidæ and Acanthodidæ. In *Ptychodus* and *Rhynchodus* we have genera of Chimæroids. The Dipnoan fishes are represented by the genus *Scaumenacia* of the Sirenoidei, and the genera *Coccosteus*, *Aspidichthys* and *Dinichthys* of the order Arthrodira. *Holoptychius*, *Eusthenopteron* and *Onychodus* are Crossopterygian genera. An advance is made by the introduction of the Actinopterygian genus *Cheirolepis*.

Comparing the Upper Devonian fauna with that of the Lower Devonian we find the Ostracoderms augmented by the order Antiarchi. The early forms of the Ichthyotomi mentioned as occurring in the Lower Devonian have no Upper Devonian representatives. Also Chimæroid, Sirenoid and Actinopterygian fishes are added to the list.

Cephalaspis laticeps and *Euphanerops longævus* are both from Scaumenac bay, Que., the latter being the only known genus and species of the family of Euphaneropidæ. We have the sole representative of the Antiarchi in *Bothriolepis canadensis*. The type of this particularly interesting genus is *B. ornata* from the Upper Devonian of Russia, described by Eichwald in 1840. Of the nine species known from England, Scotland, Russia, Canada and the United States, *B. canadensis* appears to come nearest to *B. ornata* and *B. hydrophila*, Agassiz,

described in 1844 from Scotland. The Canadian species is interesting on account of its having clearly indicated oral appendages, described by Whiteaves and also by A. S. Woodward. This genus differs from *Pterichthys* principally in the proportions of the plates, the direction of the sensory canals and the relatively longer lateral appendages which are supposed to be modified and highly specialized head spines.

As in the Lower Devonian, the *Diplacanthidæ* and *Acanthodidæ* are present, the former represented by the typical genus; the species are *Diplacanthus striatus*, *D. horridus*, *Acanthodes affinis* and *A. concinnus*, all four from Scaumenac bay. The Chimæroid genera *Ptyctodus* and *Rhynchodus* are from the Upper Devonian of Manitoba, the former also occurring in rocks of the same age in Ontario. The Dipnoans are made conspicuous in this fauna by the presence of four species belonging to the four genera, *Scaumenacia*, *Coccosteus*, *Aspidiethys* and *Dinichthys*. *Scaumenacia curta* from Scaumenac bay is a Sirenoid of the family of *Phaneropleuridæ*. The Arthrodiran lung-fishes *Coccosteus canadensis* from Scaumenac bay, *Aspidiethys notabilis* from Ontario and Manitoba, and *Dinichthys canadensis* from the same provinces, were probably worthy representatives of this extinct and highly specialized order. *Holoptychius*, *Eusthenopteron*, *Onychodus* and *Cheirolepis*, Teleostomatous fishes, complete the list of the known Devonian genera of this country. Of the Crossopterygians *Holoptychius quebecensis* and *Eusthenopteron foordi* are from Scaumenac bay, and an undetermined species of *Onychodus* is from the Cuboides zone of the Devonian of Manitoba. The Actinopterygian, *Cheirolepis canadensis* of the suborder Chondrostei still further accentuates the richness of the fish-fauna of Scaumenac bay.

The well-known *Eusthenopteron foordi* exemplifies in an admirable manner a modified "archipterygial" type of fin structure in the pectorals. In the type specimen in the museum of the Geological Survey, the relation of the unfused radial supports, in the unpaired fins, to the basals which connect directly with the axial skeleton, is particularly well shown. Dr. Whiteaves's descriptions supplemented by the results of Dr. A. S. Woodward's study of additional material from the type locality, and critical observations on the fin structure generally, by Professor Bashford Dean,¹ have made this species one of the best known of the Devonian Crossopterygians.

The Carboniferous rocks of eastern Canada have yielded a highly important vertebrate fauna comprising a variety of fishes and a wealth

¹ Fishes, living and fossil. An outline of their forms and probable relationships, by Bashford Dean, New York, 1895.

of species of Amphibians, Stegocephalians for the most part belonging to the suborders Microsauria and Labyrinthodontia. The majority of these fossils were collected by Sir William Dawson, whose writings on the air-breathers of this period have made the Coal Measures of Nova Scotia famous as a palæontological collecting ground.

4. LOWER CARBONIFEROUS FAUNA.—In the Lower Carboniferous we have a forecast only of the terrestrial life of the Upper Carboniferous in the tracks of Amphibians preserved in the rocks of Nova Scotia. An Elasmobranch or Chimæroid fish is indicated by a spine from Cape Breton island. Both of the great orders Crossopterygii and Actinopterygii are represented, the first by a single genus and species of the family of Rhizodontidæ, the second by three Palæoniscid genera.

The ichthyodorulite *Gyracanthus magnificus* is a spine of large size from Cape Breton to be seen in the Provincial Museum of Nova Scotia at Halifax. *Strepsodus hardingi* was named and figured by Dawson in 1868, but with little description; lately Dr. O. P. Hay, of the American Museum of Natural History, New York, has more fully characterized the species, his observations being limited to the scales.

Of the Chondrosteans (Ganoids) we have *Rhadinichthys alberti*, *R. cairnsii*, *R. modulus*, *Elonichthys browni* and *Acrolepis? hortonensis*, the first four from Albert county, New Brunswick, the last one from Horton bluff, Nova Scotia. The tracks having the names *Hylopus hardingi*, *H. logani* and *Palaosauropus antiquior* are all from Nova Scotia. Dr. G. F. Matthew has, in a paper, read before this Society at its last annual meeting, and entitled "An attempt to classify Palæozoic batrachian footprints," aimed at reducing to some degree of order the confusion in which he has found the "generic" grouping of the tracks of Carboniferous age in Canada and the United States. The classification suggested by Dr. Matthew is based upon the number of the toe-marks preserved. Dr. R. S. Lull of Amherst, Mass., has also been working along somewhat similar lines, having devoted some time to the study of the footprints of dinosaurs in the Triassic rocks of the Connecticut valley¹ with most interesting and important results.

5. MILLSTONE GRIT FOOTPRINTS.—In the Millstone Grit the only indication of vertebrate life so far discovered in Canada is the well-preserved impressions of footprints primarily called *Sauropus unguifer*. A slab having large and particularly distinct footmarks of this "species" was collected by Sir Sandford Fleming, who presented the track itself

¹ Fossil footprints of the Jura-Trias of North America, by Richard Swann Lull, Ph.D. Memoirs Boston Society Natural History, vol. 5, p. 461, April, 1904.

to the museum of Queen's University, Kingston, Ont., and the natural cast in the overlying layer of rock to the Geological Survey.

6. UPPER CARBONIFEROUS FAUNA.—The fish-fauna of the Upper Carboniferous rocks is small numerically compared with the number of Amphibians recorded. The remains of the latter as well as those of the fish are principally from the South Joggins, Nova Scotia.

Elasmobranchs of the order Ichthyotomi are represented by the Pleuracanthids *Dittodus acinaces* and *D. penetrans*, the descriptions of which are based on teeth from Pictou, N.S. Other forms founded on Selachian teeth are *Ctenoptychius cristatus* from the South Joggins and *Psammodus* sp? from Pictou. *Gyracanthus duplicatus* is a very perfectly preserved ichthyodolite from the South Joggins. The Dipnoans include the Dipterid species *Conchodus plicatus* from the same locality. The Teleostomes, Crossopterygians of the suborder Rhapidipteria are *Rhizodus lancifer*, *Strepsodus dawsoni* and *Parabatrachus maxillaris*, from Horton and Pictou, from Pictou, and from Cape Breton island respectively. Sir William Dawson assigned teeth and scales from Pictou, with some doubt to Newberry's species *Megalichthys* (*Rhizodus*) *lancifer* from the Coal Measures of Ohio. Dr. Hay, in his "Description of some vertebrates of the Carboniferous Age," bases a new species, *Strepsodus dawsoni*, on the Pictou scales, as he is of the opinion that they are quite different from those of Ohio, suggesting for the teeth the retention of the name under which they are referred to in the "Acadian Geology," although not certain that they are not those of an Amphibian. *Parabatrachus maxillaris* (*Megalichthys hibberti*), with which *Psammodus bretonensis*, Whiteaves, according to Hay, is synonymous, belongs to the Osteolepidæ and concludes the list of fishes from the Coal Measures.

The class Amphibia, as here referred to, is understood to include the two subclasses Stegocephalia, Cope, 1868, and Batrachia, Brogniart, 1800. The Stegocephalia are further subdivided into (I) Lepospondyli, Zittel, (II) Temnospondyli, Zittel, and (III) Labyrinthodontia, Owen. The Lepospondyli include the suborders: 1, Branchiosauria, Fritsch, 2, Microsauria, Dawson, and 3, Aistopoda, Miall. Dr. Hans Gadow¹ has recently placed the Microsauria definitely in the class Reptilia with ordinal rank (Microsauri) in the subclass Prosauria.

An undetermined species of *Sparodus* is so far the only representative of the Branchiosauria from the Coal Measures of Nova Scotia. Of the Microsauria the ten species included in the genera *Hylonomus*, *Smilerpeton*, *Hylerpeton*, *Fritschia* and *Amblyodon* are all from the South Joggins. The Labyrinthodontia still further increase the number

¹ Amphibia and Reptiles, by Hans Gadow, London, 1901.

of Stegocephalians from Nova Scotia; of these in the family of Dendrerpetontidæ are *Dendrerpeton acadianum*, *D. oweni*, *Baphetes minor*, *B. planiceps* and *Platystegos loricatum*, all from the South Joggins except *B. planiceps*, which is from Pictou. As regards *Eosaurus acadianus* from the South Joggins, described by Marsh in 1862, from vertebræ only, doubt exists as to its exact position in the zoological scale. Lydekker suggests that it may belong to the Anthracosauridæ. Marsh described the vertebræ as those of a new Enaliosaurian.

The various tracks of this age from Nova Scotia, grouped under the name Ichnites, were probably, in some cases at least, made by the Stegocephalians above mentioned.

7. TRIASSIC DINOSAUR.—The only vertebrate fossil collected from the Triassic of this country consists of the anterior end of the right ramus of the lower jaw, in which seven trenchant teeth are preserved, of a carnivorous dinosaur from Prince Edward island, described by Leidy in 1854 under the name *Bathygnathus borealis*; this is the earliest evidence we have of dinosaurian life in this country. The specimen was found by Mr. D. McLeod, of New London, on the north shore of the island, and sold by him to the Academy of Natural Sciences of Philadelphia in whose museum it is now on exhibition. *B. borealis* is placed by Marsh in the family of Anchisauridæ; it may have been responsible with *Anchisaurus* and other allied forms, for the numerous tracks of the Triassic sandstone of the Connecticut valley, which are now regarded as having been made by dinosaurs and not by birds, as formerly supposed. For full particulars as to the form of teeth, etc., of this species the reader is referred to Leidy's admirable description to be found in the Journal of the Academy of Natural Sciences of Philadelphia. As Sir William Dawson has remarked, this very interesting fossil greatly aids in establishing the age of the red sandstones of Prince Edward island.

The dinosaur above mentioned affords us a very meagre glimpse of the vertebrate life of earliest Mesozoic times. Of the known varied aquatic and terrestrial vertebrate life of the Jurassic and earlier Cretaceous periods we have no evidence whatever in Canada, principally for the reason that a systematic search for fossils in the rocks of the formations representing Jurassic and early Cretaceous times has not as yet been instituted. Our lack of information is largely the result of lack of effort to secure the same.

The closure of this immense gap in our partial knowledge of the vertebrate life of the northern half of this continent is reached with the finding of fish remains in the Colorado formation in Manitoba, mentioned under the next heading.

8. FAUNA OF THE CRETACEOUS. NIOBRARA-BENTON (COLORADO FORMATION).—The fish remains, from the Niobrara-Benton of the Cretaceous of Manitoba, represent in all four species of different genera. *Lamna manitobensis*, a Selachian of the suborder Asterospondyli, is known only from detached teeth. The second species, *Ptychodus parvulus*, also a Selachian, but of the suborder Tectospondyli, and belonging to the family of Myliobatidæ (eagle rays), is founded on a single tooth. The two remaining species are Teleostomes, one *Enchodus shumardi*, described by Leidy from the Cretaceous of Nebraska, is represented by portions of the jaws with teeth, the other *Cladocycilus occidentalis*, Leidy, also a Nebraskan Cretaceous species, is recorded on the evidence of detached cycloid scales. *E. shumardi* and *C. occidentalis* are both Actinopterygians, the former of the suborder Isospondyli, the latter belonging to the Percesoces.

9. FAUNA OF THE CRETACEOUS. BELLY RIVER SERIES.—The next fauna to be considered, that of the Belly River series, includes fishes, a batrachian, reptiles and mammals, and has a greater diversity of forms and a larger number of species than any of the preceding ones.

This fauna is decidedly archaic in some of its features and progressive in others, forming a connecting link between the known faunas of the upper Jurassic and the uppermost Cretaceous, and helps to reduce the gap in the geological records of the land inhabitants of early Cretaceous times.

Most of the fossils included in this fauna were obtained by the writer in 1897, 1898 and 1901 in the Red Deer river district in Alberta, and are described in part II of volume III (quarto) of Contributions to Canadian Palæontology.

Among the fishes we have representatives of Elasmobranchs, Ganoids and Teleosts. We are able to record the occurrence of only one Amphibian, a Urodele species of the Batrachia. The synapsidan reptiles include plesiosaurs, and turtles of the three suborders Pleurodira, Cryptodira and Trionychia. Those of the Diapsida are, a species of the order Choristodera. Dinosauria of the two suborders Theropoda and Orthopoda, Squamata, Lacertilia and Crocodilia. Two mammals are an interesting feature of the fauna.

The Selachian *Myledonophus bipartitus*, placed with the Myliobatidæ is known only from separate teeth. Cope's description was based on teeth from Montana, the genus being doubtfully referred to the Rays. Of the "ganoid" *Actinopterygii* there are two species, one, *Acipenser albertensis* belonging to the Chondrostei, and founded on a keeled and ornamented shield, the other, *Lepidosteus occidentalis*, of the suborder Aëthoespondyli was described originally by Leidy from separate scales.

The Teleost *Rhineastes eruciferus* is known only from fragments of cranial bones. *Diphyodus longirostris*, whose relationships are uncertain, is of interest; it is hoped that additional material may soon throw light on its affinities.

The batrachian species, *Scapherpeton tectum*, is the only fossil representative of the subclass that we have. Cope was of the opinion that the genus was most probably referable to the Urodela.

In this series of rocks the remains of the Reptilia present a variety of forms of land and fresh-water groups of unusual interest. The plesiosaur *Uimoliasaurus magnus*, a marine type, is known originally from the Cretaceous of New Jersey. There are in all seven genera of turtles. The Pleurodira (fresh-water tortoises) are *Compsemys* ? *victus*, *Baëna hatcheri* and *B. antiqua*, Cretaceous representatives of the Jurassic family of Pleurosternidae, a decidedly archaic feature of this fauna. The Cryptodires are of the two families of Adocidae and Chelydridae. Of the Adocidae (swamp turtles) are *Adocus lineolatus*, known from fragments of the shell having a very distinctive sculpture, and *Basilemys variolosus* (Cope's *Compsemys variolosus*) a turtle of large size with a roughly sculptured shell, of which the plastron is massive and reaches a length of nearly three feet. The Chelydroid species, *Neurankylus eximius* is peculiar in having a ninth costal bone to the carapace. The river turtles, Trionychia, are represented by one species of the family of Plastomenidae, *Plastomenus costatus*, and two of the Trionychidae, viz.: *Trionyx foveatus* and *T. vagans*, with a third not as yet determined. *T. foveatus* and *T. vagans*, previous to the expeditions to the Red Deer river were known only from shell fragments, but the material now in our possession has afforded us data for the reconstruction of almost the entire shell in each case. A well-preserved carapace (lacking only the nuchal plate) and the larger bones of two or three plastra, of *T. foveatus* are included in the collections from Alberta. As regards *T. vagans*, a complete carapace was obtained in the same region, and as there is little doubt that the species *Plastomenus coalescens*, Cope, from the Belly River series in Assiniboia, is based on the greater part of the hyoplastral and hypoplastral bones of *T. vagans*, the plastron of this species also is fairly well known.

Vertebrae referable to Cope's species *Champsosaurus annectens*, and described by the writer in 1902, are from the Belly River series of Alberta. In his memoir on "The Reptilian subclasses Diapsida and Synapsida and the early history of the Diaptosauria,"¹ Professor Osborn

¹ Memoirs of the American Museum of Natural History, Vol. I., 1903; and "Reclassification of the Reptilia," American Naturalist, vol. xxxviii., p. 93, February, 1904.

places the order Choristodera with equal rank to the Rhynchocephalia in his subdivisions of the new superorder Diaptosauria, considering it as a "sharply defined division of the Diaptosauria owing to its remarkable parallelism with the Gavialoid Crocodilia." *Champsosaurus* and *Simadosaurus* are the only known genera of the order, the former ranging from the Belly River series up to the Lower Eocene.

Taking up the dinosaurs next in order, the forms from this horizon fall into the two subordinal divisions of Theropoda and Orthopoda, with few representatives of the first or carnivorous group, but with many of the second, herbivorous dinosaurs, of the families of Stegosauridae, Ceratopsidae and Trachodontidae. The specialization noticeable in both these suborders, leading to the total extinction of the entire order at the close of the Cretaceous period is far advanced in the Ornithomimidae and Ceratopsidae. The Stegosauridae are already on the wane, there being little evidence of their occurrence in rocks higher than those of the Belly River series.

Deinodon horridus and *Ornithomimus altus* are carnivores, the former classed with the Megalosauridae, the latter with the family that takes its name from the type genus and species, *Ornithomimus velox*, from Colorado. *Deinodon horridus* is closely allied to the Jurassic *Megalosaurus* and also to its successor, *Drypsosaurus*, from the higher Edmonton series. Known principally from teeth, additional material and further study are necessary for a better understanding of its generic relationships. *Ornithomimus altus* is a cursorial type with great grasping power in the manus, and is larger and shows greater specialization than its supposed ancestor *Ornitholestes hermanni*, a lightly built compsognathoid dinosaur recently described by Osborn from a nearly perfect skeleton from the Como beds (Upper Jurassic) of Wyoming. Among the characteristics of *O. altus* may be mentioned the straightness of the terminal phalanges of the pes, the great curvature and lateral compression of those of the manus, the elongation and crowding together of the metatarsals and the remarkable development of the postzygapophyses of the caudal vertebræ, which have lost their neural spines.

Palæoscincus asper and *P. costatus*, known from teeth, have been doubtfully referred to the Stegosauria. *Stereocephalus tutus* is a very heavily armoured Stegosaur of large size, with coössified plates protecting the head, and transverse rows of postcranial keeled ossicles. On this protective armour *Stereocephalus* no doubt relied in a great measure for immunity from the attacks of its agile carnivorous contemporaries.

The Ceratopsids *Monoclonius belli*, *M. canadensis* and *M. dawsoni* are ancestral types of the much larger forms of *Triceratops* and *Torosaurus* from the Laramie. *Stegoceras* is a new type to which reference

will be made later. *Monoclonius belli*, apparently nearly related to, and about one-third the size of *Torosaurus gladius*, Marsh, is known only from the coalesced parietals of the posterior crest in which are fontanelles of enormous size. *M. canadensis*, founded on parts of the skull, and vertebrae, has double fanged teeth, small supraorbital horns and a squamosal of triangular shape, scalloped on the outer edge, resembling somewhat the same bone in *Triceratops* and *Sterrholophus*. *M. dawsoni* has a large nasal horn and a broad saddle-shaped posterior crest in which are fontanelles or fossæ of large size, and is probably closely related to the Montana form *M. crassus*. The Montana species *Monoclonius crassus*, *M. recurvicornis*, *M. sphenocerus* and *M. fissus*, and those of the Belly River series, *M. belli*, *M. canadensis* and *M. dawsoni* constitute a particularly interesting and important group concerning which little is as yet known, the members of which, however, are smaller and apparently more primitive than the Laramie Ceratopsia. Professor Osborn is of the opinion that "it is not at all improbable that the horned dinosaurs will prove to be diphyletic, one line with persistent open fossæ leading from *Monoclonius* to *Torosaurus*, the other leading to *Triceratops* with closed fossæ." *Stegoceras validus* is based on portions of the skull from the median line of the head with indications on the upper surface of the presence of an unpaired horn. These parts were supposed to be prenasal, but, as pointed out by Nopcsa,¹ they probably represent the frontal and nasal elements of the skull. In *Stegoceras* we have an entirely new type, a unicorn dinosaur remarkable in that it bore a horn springing from the fronto-nasal region, recalling a somewhat similar development in the mammals *Aceratherium incisivum* and *Elasmotherium sibiricum*.

With the consideration of the *Trachodontidae* (duck-billed dinosaurs) we reach a group of unarmed, bipedal, in many respects highly specialized Predentata, of which the Belly River series species are *Trachodon altidens*, *T. marginatus*, *T. selwyni* and *Cionodon stenopsis*. The mode of succession of the teeth in these herbivorous forms is one of the most interesting characteristics of the group. *T. altidens*, as its name implies, is distinguished from the other species by its long, narrow teeth, with distinctive border sculpture. A well-preserved maxilla represents this species and indicates an animal of small size. *T. marginatus*, known from excellent examples of the jaws with teeth, and the principal bones of the skeleton, reached a much larger size than *T. altidens*, but was itself far surpassed in bulk by *T. selwyni*, whose femur is nearly twice the size of that of *Iguanodon mantelli* of the

¹ "Ueber *Stegoceras* und *Stereocephalus*" von Franz Baron Nopcsa, jun., Centralblatt für Mineralogie, etc. No. 8, 1903. Stuttgart.

Upper Jurassic (Wealden) of England. The differences to be found in the shape and marginal sculpture of the teeth afford some of the most reliable data by which these species may be distinguished. *Cionoden stenopsis*, described by Cope from this horizon in Assiniboia, is very imperfectly known from small fragments of the jaw. Although, in his original description, Cope mentions that parts of teeth were preserved with the jaw-fragments, no trace of the former are now with the type material in the museum of the Geological Survey.

Troödon formosus has been provisionally referred to the Lacertilia; it is known from teeth alone. Belonging also to the Squamata, of the suborder *Eusuchia*, are the two crocodiles *Crocodylus humilis*, named from numerous teeth, and *Bottosaurus perrugosus*, of which the lower jaw and the brain case are now known. This completes the list of reptiles.

The earliest mammalian remains, and the only Cretaceous ones, so far collected in this country, have been named *Ptilodus primævus* and *Boreodon matutinus*, and are from the Red Deer river. *P. primævus* is a multituberculate mammal more primitive than the Laramie Plagiolacids, and is the earliest known species of the genus. The writer succeeded in obtaining a tolerably complete right mandibular ramus, in which are preserved the fourth premolar and the first molar. The teeth present characters that seem to indicate an approach to the Laramie Cretaceous genus *Meniscoessus*. *Boreodon* is founded on a single tooth having a well-developed cingulum and two roots. Mr. Hatcher, of the Carnegie Museum, Pittsburgh, was fortunate enough during the summer of 1903 to find, in rocks of this horizon, a mandibular ramus, which he considers to belong to this species. He is of the opinion that the animal will prove to be a marsupial. A description of this additional material would be of interest.

As regards the fauna of the Belly River series as a whole it is decidedly archaic in character as compared with that of the Laramie, it includes specialized types that have survived from Jurassic times and groups in stages of evolution more primitive than their Laramie representatives. Attention is called to the absence of Sauropoda, a group almost confined to the Jurassic.

10. CRETACEOUS FAUNA. NANAIMO GROUP.—The Nanaimo group of the Cretaceous as developed in Vancouver island, has yielded as yet few vertebrate fossils. A tooth of the Selachian, *Lamna appendiculata* of the suborder *Asterospondyli*, is from this horizon. *Asterospondylic* vertebræ thought to belong to the Carchariidæ, as well as vertebræ of a Hemibranch of the family of Dercetidæ, also occur in these rocks.

11. CRETACEOUS. VERTEBRATE REMAINS FROM THE FORT PIERRE GROUP.—The same paucity of vertebrate remains is to be recorded from the Fort Pierre group of the North West Territory. The remains so far collected are of Selachii and consist of a tooth and a pectoral fin from localities in Saskatchewan and Assiniboia.

Without doubt our knowledge of the vertebrate faunas of the Nainimo and Fort Pierre groups could be greatly extended by a moderate amount of systematic collecting, and the same may be said of the faunas of the different geological horizons throughout this country generally. The few fish remains so far obtained from the two Cretaceous groups just mentioned have been found by local collectors at odd times, or by officers of this Survey (other than paleontologists), who, with their time fully occupied with exploratory and purely stratigraphical work, have been quite unable to afford the time necessary for even a hurried search for fossils in the most promising localities.

12. CRETACEOUS. VERTEBRATE REMAINS FROM THE EDMONTON SERIES.—The Edmonton series, constituting the highest beds of the Cretaceous system in the western plains, has furnished its quota of dinosaurian remains in the shape of excellently preserved crania, with other parts of the skeleton, of the large carnivore *Dryptosaurus incrassatus* from the Red Deer river in Alberta. These remains, first described by Cope in 1892, form the subject of an illustrated memoir by the writer¹ now in the press. This dinosaur, with an estimated length of about thirty-three feet, and a length of head, from actual measurement, of over three feet, was the largest of the Theropoda and combined strength with a capability of rapid motion. It formed a proper culmination to an important section of a race that had played its part in the life history of this earth, and was destined not to survive the close of the Cretaceous epoch. *D. incrassatus*, from the west and *D. aquilunguis* from the Cretaceous of New Jersey, belong to the family of Megalosauridae, and are the best known species of the genus.

13. DINOSAURIAN VERTEBRA FROM MESOZOIC BEDS.—A cervical vertebra of a dinosaur described by Professor A. L. Adams in 1875 under the name *Arctosaurus osborni*, was obtained many years previously by Captain Sherrard Osborn from beds of Mesozoic age at Rendezvous mountain at the north end of Bathurst island in 70° 36' north latitude. The exact age of the beds is uncertain, but it is interesting to know that remains of a dinosaur have been found at the northernmost limits of Canada. *Arctosaurus osborni*, the only species of the genus, is re-

¹ Geol. Surv. of Canada, Contr. to Can. Palæon, Vol. III. (quarto), part III., "On *Dryptosaurus incrassatus* (Cope), from the Edmonton series of the North West Territory."

garded by Lydekker as a Theropodous dinosaur allied to the Anchi-sauridæ.

In his description of the above vertebra Lydekker remarks that "the especial interest of the specimen is the evidence which it affords as to the path by which the generic types of dinosaurs common to the old and new world may have passed from one hemisphere to the other." The type specimen is preserved in the museum of Science and Art, Dublin.

14. TERTIARY BIRD.—The only fossil bird, known from this country, older than the Pleistocene, was described by Cope in 1894, from the upper part of a tarsometatarsus obtained by Dr. G. M. Dawson at Carmanah point, Vancouver island, in a bed of indurated clay of Tertiary age. For the specimen Cope proposed the name *Cyphornis magnus*, the probable affinity of the genus being regarded as with the order Steganopodes. According to Cope, the characters of *Cyphornis* indicate the age of the bed to be Eocene or Oligocene. Also according to the same author "the presumed affinity with the Steganopodes indicates natatory habits, and probable capacity for flight. Should this power have been developed in *Cyphornis magnus*, it will have been much the largest bird of flight thus far known."

15. THE OLIGOCENE FAUNA.—The vertebrate life of Oligocene times is revealed to us in the 1883-84 collections of Messrs. R. G. McConnell and T. C. Weston from the Cypress hills, Assiniboia, described by Professor Cope. The fauna consists of fishes, turtles and mammals, the last, as might be expected, greatly preponderating, as with the Eocene began that dominance of the Mammalia which has continued to the present day.

The fishes are Actinopterygians, Protospondyli, the dominant fishes of the Jurassic period and Nematognathi, the Siluroid fishes. The former are represented by two species of the family of Amiidæ, *Amia macrospondyla* and *A. whiteavesiana*, each known from a single vertebra, the latter by three species of the Siluridæ, *Rhineastes rhæas*, *Amiurus cancellatus* and *A. macconnelli*, also described from vertebrae.

The turtles *Styemys nebrascensis* and *Trionyx leucopotamicus* are represented by shell fragments. The former species is a Cryptodire belonging to the Testudinidæ, the latter a river turtle of the family of Trionychidæ. It is desirable that better material be secured of these interesting forms.

The mammals of this period belong to the orders Ungulata, Ancylopoda, Rodentia and Carnivora, with a number of species of Perissodactyles and Artiodactyles among the Ungulates.

Considering first the Perissodactyla or odd-toed hoofed animals, the horses are represented by *Mesohippus westoni*, the titanotheres by

three species of *Megacerops* and one of *Symborodon*, the hyracodonts by one species of *Hyracodon*, and the rhinoceroses by two species of *Aceratherium*.

Mesolhippus westoni is known from teeth of primitive character, and is named after Mr. T. C. Weston, to whom the Survey is indebted for so many years of faithful service as a collector. *Megacerops angustigenis* is based on numerous specimens of upper and lower jaws with teeth with which were associated as probably belonging to the same species certain bones of the skull and limbs affording additional information.

The fossil remains from the Cypress hills that Cope identified with *Menodus americanus*, Leidy and *M. proutii*, Owen, Norwood and Evans are, in the light of recent research, probably referable to *Megacerops coloradensis*, Leidy. The results of the exhaustive studies of the Titanotheres made by Professor Osborn of late years are to be found in his papers entitled "The Cranial Evolution of Titanotherium,"¹ 1896, and "The Four Phyla of Oligocene Titanotheres,"² 1902. They form a solid basis for future research, and with them a proper understanding of the group is rendered possible, and a welcome release offered from the almost hopeless confusion into which the literature relating to these mammals had fallen, a confusion arising principally from a multiplicity of synonymous terms. *M. selwynianus* is a third species, named in honour of Dr. Alfred R. C. Selwyn, under whose able direction the Geological Survey of Canada made rapid and substantial progress during many years. *Menodus syceras*, Cope, is regarded by Osborn as probably identical with *Symborodon acer*, Cope. The material on which *M. syceras* was based consists of pairs of coössified nasal bones that exhibit characters such as are found in the corresponding bones of *S. acer*.

The ancient rhinoceroses from this region are *Aceratherium occidentale* (Leidy) represented by a fragment of a right mandibular ramus, and *A. mite* (syn. *A. pumilum*, Cope in part).

The type specimen of *A. (Canopus) pumilum*, Cope, consisting of the anterior end of a jaw holding deciduous teeth, has been shown by Osborn¹ to belong not to an Acerathere but to an Hyracodon, viz.: *Hyracodon nebrascense*, Leidy. The cotype of *A. pumilum*, which is of necessity now to be regarded as the type, establishes, according to the same authority, the identity of *A. pumilum* with *A. mite*, Cope, of the Symborodon or Titanotherium beds of north-western Colorado.

¹ Bulletin. American Museum of Natural History, vol. viii., article ix., p. 91.

² *Ibid*, vol. xvi., article viii., p. 91.

³ Memoirs of the American Museum of Natural History, vol. I., part III., "The Extinct Rhinoceroses, by Henry Fairfield Osborn, New York, 1898.

Among the Artiodactyla we have representatives of the Suidæ, Agriochæridæ and Camelidæ. The highly specialized pig-like animals of large size of the genus *Elotherium* are known from a number of species from the Oligocene and Miocene beds of the western United States. *E. coarctatum* is a species from Assiniboia considered of interest on account of the primitive character of its teeth; it was established on a left mandibular ramus. Remains of the Agriochæridæ probably better known as the Oreodontidæ, of which the typical genera were termed ruminating hogs by Leidy, are scarce in the Cypress hills collections. The presence of the genus *Oreodon* is doubtfully indicated by a lower first premolar. Of the genus *Leptomeryx*, which, with closely allied forms, resembles the Cervidæ of the Pliocene, there are three species, *L. esulcatus*, *L. mammiifer* and *L. semicinctus*, the first two of which are also recorded from the Titanotherium beds of Montana by Dr. W. D. Matthew.² *Hypertragulus transversus* of the family of Camelidæ is characterized from two upper molar teeth. This genus as well as *Leptomeryx* is placed by some authors with the Tragulidæ.

The order Ancylopoda includes primitive Ungulates having a curious assemblage of characters, among which may be mentioned as most striking the ungulate teeth and skull and the unguiculate terminal phalanges. *Chalicotherium* has been referred to by Osborn as an unguiculate perissodactyl. It is represented in our west by the Cypress hills species *C. bilobatum*, described by Cope from part of the jaw of an adult individual.

To the Leporidæ, hares and rabbits, belongs the Oligocene species *Palæolagus turgidus*, previously known from the White River beds of Dakota and Colorado. This, the only rodent from the Cypress hills district, is represented by mandibular rami.

There is evidence of one species only of the Carnivora, viz.: *Hemip-salodon grandis* of the family of Hyænodontidæ. Of it Cope remarks in his description of the species that "it was the largest flesh-eater of the epoch of the White River beds, and the size of its canine teeth proves it to have been a dangerous animal," also that "the jaw from which it is known is more robust than that of any existing carnivore."

A perusal of the Oligocene faunal list will convince any reader of the great variety of ancient and interesting forms of mammals that inhabited our western country during this early Tertiary time. The collections in our possession clearly show that the Cypress hills district may be regarded as probably the most promising collecting ground for fossil mammalian remains in Canada, and that with the aid of modern

² Bulletin, American Museum of Natural History, "The Fauna of the Titanotherium Beds at Pipestone Springs, Montana," vol. xix., article vi., p. 197, 1903.

field methods the results to be obtained from a systematic exploration of the beds of this district would be of the greatest possible value from a palæontological and general geological standpoint.

Before turning our attention to the life of Pleistocene times, the next to be considered, as no vertebrate fossils have been collected from rocks of Miocene and Pliocene age in Canada, it is necessary to mention certain fishes from British Columbian Tertiary beds that have been assigned with some doubt to the Oligocene.

16. TERTIARY FISHES.—The fishes referred to above are Plectospondyli of the family of Cyprinidæ belonging to the genus *Amyzon*. There are two species, the first *A. brevipinne* from the Similkimeen river, British Columbia, the second an undetermined species of the same genus from the Horse Fly river of the same province.

17. FAUNA OF THE PLEISTOCENE.—In the Pleistocene we come to forms the majority of which now exist. The several species of fishes found in the Leda clay of the St. Lawrence and Ottawa valleys are well-known living forms common in the Gulf of St. Lawrence and along the Atlantic coast. The only remains of birds are some undetermined bones that were obtained many years ago from the Leda clay at Montreal, and an impression of a small feather beautifully preserved in a nodule collected from the same deposit at Green's creek near Ottawa in 1881. *Delphinapterus leucas* (*Beluga catadon*), the white whale, white porpoise or beluga, is an Arctic species that at present occurs as far south as the Gulf of St. Lawrence, finding its way up the river of that name past Murray Bay; it is more abundant on the north than on the south shore of this river. The remains of this species have been found in the Pleistocene at Jacquet river, N.B., and at Rivière du Loup (en bas), Montreal and Cornwall. *Megaptera boöps* (*M. longimana*), the humpback whale, exists now in all seas. Some of the bones of a skeleton of this species were found in 1882 in a Pleistocene gravel deposit near Smith falls, Ontario. The Mastodon (*Mammut*) and Mammoth, judging from the wide distribution and number of their remains, must have been plentiful over a very large portion of this country, the range of the Mastodon extending from the east to what is now Manitoba, that of the Mammoth reaching eastward from the Pacific almost across the continent. Remains of one-toed horses have not been found in Canada, although so well-known from the Pleistocene of various parts of the United States, including Alaska. Marsh regarded the North American continent as the true home of the horse. It still existed here in the early part of the Quaternary period, and may have been a contemporary of prehistoric man. We know, however, that the native races at the advent of the white man to this continent knew nothing of the horse. There are few records of the finding of

bones of *Cervus canadensis* in the Pleistocene. Logan in his 1863 report (Geol. Surv. of Canada, p. 914) mentions the occurrence of the horns of this species near Hamilton, Ontario, associated with the jaw of a beaver, and in the same deposit, but a few feet lower, the remains of a mammoth. Tyrrell in his "Mammalia of Canada,"¹ points out that "the name 'Wapiti' was applied to this species by Richardson, who was apparently under the erroneous impression that the Indians knew it by this name. The Indian name 'Wapitik' belongs, however, to the Mountain Goat and not to the *Waskesew*.² The former means 'white deer' (both the mountain sheep and mountain goat being considered as deer) and it would therefore only apply to the white Mountain Goat" (*Aplocerus montanus*). Dr. G. M. Dawson mentions in his Annual Report for 1898, the finding of part of the skull of a musk-ox (*Ovibos moschatus*) near Edmonton, Alberta, in the "Saskatchewan gravels" from which also a few miles above Edmonton a tooth of *Elephas primigenius* was obtained. Lydekker, in his Catalogue of the Fossil Mammalia in the British Museum, pt. II, states that a portion of a skull of the musk-ox was discovered in the Pleistocene of the Upper Porcupine river, Yukon. The remains of *Bison crassicornis* are recorded by Whiteaves from the Klondyke district, and by Lydekker from the Porcupine river. The latter's reference to the species is made under the name *Bos bonasus* (Linn.) var. *priscus* (Bojanus) a form that in the opinion of some authorities is not distinct from *B. crassicornis*, Richardson. The finding of a jaw of *Castor canadensis*, the American beaver, near Hamilton, Ontario, has been already referred to. Numerous remains of *Phoca grælandica*, the Greenland seal, also known as the Harp and Saddle-backed seal, have been found in the Leda clay at Montreal, Hull and Ottawa. For more detailed information regarding some of the above species from the Pleistocene the reader is referred to Sir William Dawson's well-known work "The Canadian Ice Age," published in Montreal in 1893.

In the two following lists the vertebrate species known from Canada are enumerated (1) according to their geological age in ascending order, (2) according to their position in the zoological scale passing from the lowest forms up to the highest. An attempt has been made to make the lists as complete as possible, and dates and localities are added. The dates given in the second list refer to the time of publication of the original descriptions of species based on specimens from Canada or to the identification of Canadian specimens with previously

¹ "The Mammalia of Canada," Proceedings of the Canadian Institute, third series, vol. vi., p. 66, 1889.

² *Wa-was-ka-sioo* is the Cree name for *Cervus canadensis*.

described species from the United States or elsewhere. Following the faunal lists is a short bibliography containing the more important references to the vertebrate species of Canada.

Summarizing the species in their several classes we have the following result:—

	No. of species.
AGNATHA	8
PISCES	72
AMPHIBIA	39 (<i>of which 21 are tracks.</i>)
REPTILIA	35
AVES.. . . .	3
MAMMALIA	28
Total	185

From this it is seen that the fishes far outnumber the other forms; the reptiles come second and the mammals third. As most of the tracks were probably made by the amphibians the latter may be supposed to number about eighteen.

Or grouping the various species according to their geological age, thus:—

	No. of species.
SILURIAN	2
LOWER DEVONIAN	16
UPPER DEVONIAN	17
LOWER CARBONIFEROUS	11 (<i>of which 4 are tracks.</i>)
CARBONIFEROUS. MILLSTONE GRIT	1 <i>Track</i>
CARBONIFEROUS. COAL MEASURES	42 (<i>of which 16 are tracks.</i>)
TRIASSIC	1
CRETACEOUS. NIOBRARA-BENTON.. . . .	4
CRETACEOUS. BELLY RIVER	39
CRETACEOUS. NANAIMO.. . . .	3
CRETACEOUS. FORT PIERRE.... . . .	2
CRETACEOUS. EDMONTON	1
MESOZOIC.....	1
TERTIARY	1
OLIGOCENE	25
TERTIARY (? OLIGOCENE).. . . .	2
PLEISTOCENE	17

we find that the faunas of the Lower and Upper Devonian, the Upper Carboniferous, the Belly River and Oligocene rocks are greater, in the number of their contained species, than those of the other horizons (with the exception of the Pleistocene), a result partly to be accounted for by the fact that special attention has been given at various times to these rocks as exposed at Campbellton, Scaumenac bay, the Joggins,

Red Deer river and the Cypress hills in an endeavour to obtain collections as representative as possible of their fossil vertebrate remains. This result is, however, an excellent example of the advantage to be derived from careful palæontological field work and systematic collecting.

It may certainly be said that we have so far made fair progress in the vertebrate palæontology of this country if we take into consideration, the very limited number of those who have devoted any time to the study of the fossil vertebrata of the Dominion, and how few have been the attempts made to secure a really representative collection of the vertebrate remains of any particular series of beds.

If we consider the magnificent results attained by the various institutions of some countries and the extensive collections exhibited in their museums, knowing that, throughout the Dominion generally, but particularly in the west, equally good results are forthcoming if proper means are taken to secure them, then we should realize the fact that as yet we have only made a beginning.

SPECIES ARRANGED ACCORDING TO THEIR GEOLOGICAL AGE.

SILURIAN.

Class AGNATHA.

Cyathaspis acadica (Matthew). Nerepis hills, King's county, New Brunswick. Thought to be of Niagara age.

Class PISCES.

Dendrodus arisaigensis, Whiteaves. Upper Arisaig series, McDonald brook, near Arisaig, Nova Scotia. (Lower Helderberg group.)

LOWER DEVONIAN.

Class AGNATHA.

Cephalaspis campbelltonensis, Whiteaves. Campbellton, New Brunswick.

Cephalaspis sp. Campbellton, New Brunswick.

Cephalaspis dawsoni, Lankester. Gaspé, Quebec.

Cephalaspis jexi, Traquair. Campbellton, New Brunswick.

Class PISCES.

Protodus jexi, A. S. Woodward. Campbellton, New Brunswick.

Doliodus problematicus (A. S. Woodward). Campbellton, New Brunswick.

Olimatius latispinosus (Whiteaves). Campbellton, New Brunswick.

Spine of ? *Acanthodian fish* (*Homacanthus gracilis*, Whiteaves). Campbellton, New Brunswick.

- Acanthodes semistriatus*, A. S. Woodward. Campbellton, New Brunswick.
- Cheiracanthus costellatus* (Traquair). Campbellton, New Brunswick.
- Machæracanthus peracutus*, Newberry. Corniferous formation, Ontario.
- Machæracanthus sulcatus*, Newberry. Corniferous formation, Ontario; and Lower Devonian, Gaspé, Quebec.
- Gyracanthus incurvus*, Traquair. Campbellton, New Brunswick.
- Phlyctænaspis acadica* (Whiteaves). Campbellton, New Brunswick.
- ? *Macropetalichthys sullivanii*, Newberry. Corniferous formation of Ontario; and Mettagami river, Ontario, in rocks of apparently the same age.
- Onychodus sigmoides*, Newberry. Corniferous formation, Ontario.

UPPER DEVONIAN.

Class AGNATHA.

- Cephalaspis laticeps*, Traquair. Scaumenac bay, Quebec.
- Euphanerops longævus*, A. S. Woodward. Scaumenac bay, Quebec.
- Bothriolepis canadensis*, Whiteaves. Scaumenac bay, Quebec.

Class PISCES.

- Diplacanthus striatus*, Agassiz. Scaumenac bay, Quebec.
- Diplacanthus horridus*, A. S. Woodward. Scaumenac bay, Quebec.
- Acanthodes affinis*, Whiteaves. Scaumenac bay, Quebec.
- Acanthodes concinnus*, Whiteaves. Scaumenac bay, Quebec.
- Ptyctodus calceolus*, Newberry and Worthen. Cuboides zone of the Devonian of Manitoba; and Hamilton formation of Ontario.
- Rhynchodus* sp. undt. Cuboides zone of the Devonian of Manitoba.
- Scaumenacia curta* (Whiteaves). Scaumenac bay, Quebec.
- Coccosteus canadensis*, A. S. Woodward. Scaumenac bay, Quebec.
- Aspidichthys* ? *notabilis*, Whiteaves. Cuboides zone of the Devonian of Manitoba; and Hamilton formation of Ontario.
- Dinichthys canadensis*, Whiteaves. Cuboides zone of the Devonian of Manitoba.
- Holoptychius quebecensis* (Whiteaves). Scaumenac bay, Quebec.
- Eusthenopteron foordi*, Whiteaves. Scaumenac bay, Quebec.
- Onychodus* sp. undt. Cuboides zone of the Devonian of Manitoba.
- Cheirolepis canadensis*, Whiteaves. Scaumenac bay, Quebec.

LOWER CARBONIFEROUS.

Class PISCES.

- Gyracanthus magnificus*, Dawson. Cape Breton island, Nova Scotia.
- Strepsodus hardingi* (Dawson). Horton bluff and Pictou, Nova Scotia.
- Rhadinichthys alberti* (Jackson). Hillsborough, Albert county, New Brunswick.
- Rhadinichthys cairnsii* (Jackson). Hillsborough, Albert county, New Brunswick.

Rhadinichthys modulus (Dawson). Hillsborough, Albert county, New Brunswick.

Elonichthys browni (Jackson). Hillsborough, Albert county, New Brunswick.

Acrolepis ? *hortonensis*, Dawson. Horton bluff, Nova Scotia.

ICHNITES.

Hylopus hardingi, Dawson. Parrsboro', Nova Scotia.

Hylopus logani, Dawson. Horton bluff, Nova Scotia.

Palæosauropus antiquior (Dawson). Parrsboro', Nova Scotia.

Megapezia pineoi, Matthew. Parrsboro', Nova Scotia.

CARBONIFEROUS. MILLSTONE GRIT.

ICHNITES.

Pseudobradypus (*Sauropus*) *unguifer* (Dawson). Fillmore's quarry, Cumberland county, Nova Scotia.

CARBONIFEROUS. COAL MEASURES.

Class PISCES.

Dittodus acinaces (Dawson). Pictou, Nova Scotia.

Dittodus penetrans (Dawson). Pictou, Nova Scotia.

Ctenoptychius cristatus, Dawson. South Joggins, Nova Scotia.

Psammodus sp. ? Pictou, Nova Scotia.

Gyracanthus duplicatus, Dawson. South Joggins, Nova Scotia.

Conchodus plicatus, Dawson. South Joggins, Nova Scotia.

Rhizodus lancifer ? Newberry. Horton bluff and Pictou, Nova Scotia.

Strepsodus dawsoni, Hay. Pictou, Nova Scotia.

Parabatrachus maxillaris (Agassiz). Cape Breton island, Nova Scotia.

Class AMPHIBIA.

Sparodus sp. undt. South Joggins, Nova Scotia.

Hylonemus latidens, Dawson. South Joggins, Nova Scotia.

Hylonemus lyelli, Dawson. South Joggins, Nova Scotia.

Hylonemus multidentis, Dawson. South Joggins, Nova Scotia.

Hylonemus wymani, Dawson. South Joggins, Nova Scotia.

Smilerpeton acidentatum, Dawson. South Joggins, Nova Scotia.

Hylerpeton dawsoni, Owen. South Joggins, Nova Scotia.

Hylerpeton intermedium, Dawson. South Joggins, Nova Scotia.

Hylerpeton longidentatum, Dawson. South Joggins, Nova Scotia.

Fritschia curtidentata, Dawson. South Joggins, Nova Scotia.

Amblyodon problematicus, Dawson. South Joggins, Nova Scotia.

Dendrerpeton acadianum, Owen. South Joggins, Nova Scotia.

Dendrerpeton oweni, Dawson. South Joggins, Nova Scotia.

Baphetes minor, Dawson. South Joggins, Nova Scotia.

Baphetes planiceps, Owen. Pictou, Nova Scotia.

Platystegos loricatum, Dawson. South Joggins, Nova Scotia.

Eosaurus acadianus, Marsh. South Joggins, Nova Scotia.

ICHTHITES.

- Asperipes avipes*, Matthew. South Joggins, Nova Scotia.
Asperipes sp. South Joggins, Nova Scotia.
Asperipes (Hylopus) caudifer (Dawson). South Joggins, Nova Scotia.
Ornithoides (Hylopus?) trifidus (Dawson). South Joggins, Nova Scotia.
Hylopus minor, Dawson. South Joggins, Nova Scotia.
Hylopus sp. undt. South Joggins, Nova Scotia.
Hylopus? sp. South Joggins, Nova Scotia.
Baropezia (Sauropus) sydnensis (Dawson). Sydney, Cape Breton island, Nova Scotia.
Baropezia sp. Sydney, Cape Breton island, Nova Scotia.
Thenaropus? macnaughtoni, Matthew. South Joggins, Nova Scotia.
Barillopus unguifer, Matthew. South Joggins, Nova Scotia.
Barillopus sp. South Joggins, Nova Scotia.
Barillopus sp. South Joggins, Nova Scotia.
Dromillopus celer, Matthew. South Joggins, Nova Scotia.
Cursipes dawsoni, Matthew. South Joggins, Nova Scotia.
Cursipes sp. South Joggins, Nova Scotia.

TRIASSIC.

Class REPTILIA.

- Bathygnathus borealis*, Leidy. Prince Edward island.

CRETACEOUS. NIOBRARA-BENTON (COLORADO FORMATION).

Class PISCES.

- Lamna manitobensis*, Whiteaves. Rolling river, Manitoba.
Ptychodus parvulus, Whiteaves. Swan river, Manitoba.
Enchodus shumardi, Leidy. Rolling river, Manitoba.
Cladocyclus occidentalis, Leidy. Rolling river and other localities in Manitoba.

CRETACEOUS. BELLY RIVER SERIES.

Class PISCES.

- Myledaphus bipartitus*, Cope. Alberta.
Acipenser albertensis, Lambe. Alberta.
Lepidosteus occidentalis (Leidy). Alberta.
Lepidosteus (Clastes) sp. Assiniboia.
Rhinecastes cruciferus (Cope). Alberta.
Diphyodus longirostris, Lambe. Alberta.

Class AMPHIBIA.

- Scapherpeton tectum*, Cope. Alberta.

Class REPTILIA.

- Cimoliasaurus magnus*, Leidy. Alberta.
Compsemys ? victus, Cope. Assiniboia.
Baëna hatcheri, Hay. Alberta.
Baëna antiqua. Lambe. Alberta.
Adocus lincolatus, Cope. Alberta.
Basilcmys variolosus (Cope). Alberta and Assiniboia.
Neurankylus cœmimus. Lambe. Alberta.
Plastomenus costatus, Cope. Assiniboia.
Trionyx foveatus, Leidy. Alberta.
Trionyx vagans, Cope. Assiniboia and Alberta.
Trionyx sp. Assiniboia.
Champsosaurus annectens, Cope. Alberta.
Deinodon horridus, Leidy. Alberta.
Deinodon explanatus (Cope). Alberta.
Ornithomimus altus, Lambe. Alberta.
Palæoscincus asper. Lambe. Alberta.
Palæoscincus costatus, Leidy. Alberta.
Stereocephalus tutus, Lambe. Alberta.
Monoclonius belli, Lambe. Alberta.
Monoclonius canadensis, Lambe. Alberta.
Monoclonius dawsoni, Lambe. Alberta.
Stegoceras validus, Lambe. Alberta.
Trachodon altidens, Lambe. Alberta.
Trachodon marginatus, Lambe. Alberta.
Trachodon schwyni, Lambe. Alberta.
? Trachodon ? sp. Assiniboia.
Cionodon stenopsis, Cope. Assiniboia.
Troödon formosus, Leidy. Alberta.
Crocodilus humilis, Leidy. Alberta.
Bottosaurus perrugosus, Cope. Alberta.

Class MAMMALIA.

- Ptilodus primævus*, Lambe. Alberta.
Borcodon matutinus, Lambe. Alberta.

CRETACEOUS. NANAIMO GROUP.

Class PISCES.

- Lamna appendiculata* (Agassiz). Near Wellington, Vancouver island,
 British Columbia.
Asterospondylic vertebra. Puntledge or Comox river, Vancouver is-
 land, British Columbia.
Vertebra of a teleost. Hornby island (off Vancouver island), British
 Columbia.

CRETACEOUS. FORT PIERRE GROUP.

Class PISCES.

- Selachian tooth*. Battle river, Saskatchewan.
Pectoral fin of a large Selachian. Sounding creek, Assiniboia.

CRETACEOUS. EDMONTON SERIES.

Class REPTILIA.

Dryptosaurus incrassatus (Cope). Alberta.

MESOZOIC.

Class REPTILIA.

Arctosaurus osborni, Adams. Bathurst island, District of Franklin.

TERTIARY.

Class AVES

Cyphornis magnus, Cope. Carmanah point, Strait of Juan de Fuca, Vancouver island, British Columbia. (According to Cope, "not older than Eocene nor later than Oligocene.")

OLIGOCENE (or LOWER MIOCENE).

Class PISCES.

Amia macrospondyla, Cope. Cypress hills, Assiniboia.

Amia whiteavesiana, Cope. Cypress hills, Assiniboia.

Rhineastes rhæas, Cope. Cypress hills, Assiniboia.

? *Rhineastes*, Cope. (vertebræ). Cypress hills, Assiniboia.

Amiurus cancellatus, Cope. Cypress hills, Assiniboia.

Amiurus macconnelli, Cope. Cypress hills, Assiniboia.

Class REPTILIA.

? *Stylemys nebrascensis*, Leidy. Cypress hills, Assiniboia.

Trionyx leucopotamicus, Cope. Cypress hills, Assiniboia.

Class MAMMALIA.

Mesohippus westoni (Cope). Cypress hills, Assiniboia.

Megacerops angustigenis (Cope). Cypress hills, Assiniboia.

Megacerops coloradensis ? Leidy. Cypress hills, Assiniboia.

Megacerops selwynianus (Cope). Cypress hills, Assiniboia.

? *Symborodon acer*, Cope. Cypress hills, Assiniboia.

Hyracodon nebrascensis, Leidy. Cypress hills, Assiniboia.

Aceratherium mite, Cope. Cypress hills, Assiniboia.

Aceratherium occidentale (Leidy). Cypress hills, Assiniboia.

Elothierium coarctatum, Cope. Cypress hills, Assiniboia.

? *Orcodon*, Leidy. Cypress hills, Assiniboia.

Leptomeryx esulcatus, Cope. Cypress hills, Assiniboia.

Leptomeryx mammifer, Cope. Cypress hills, Assiniboia.

Leptomeryx semicinctus, Cope. Cypress hills, Assiniboia.

Hypertragulus transversus, Cope. Cypress hills, Assiniboia.

Chalicotherium bilobatum, Cope. Cypress hills, Assiniboia.

Palæolagus turgidus, Cope. Cypress hills, Assiniboia.

Hemipsalodon grandis, Cope. Cypress hills, Assiniboia.

TERTIARY (? OLIGOCENE).

Class PISCES

Amyzon brevipinne, Cope. North fork of Similkimeen river, British Columbia.

Amyzon sp. Horse Fly river, British Columbia.

PLEISTOCENE.

Class PISCES

Salmo salar ? Linn. Common Atlantic salmon. Goose river, north shore of St. Lawrence river, Quebec.

Mallotus villosus (Müller). Capelin. Green's creek (Leda clay), near Ottawa, Ontario.

Osmerus mordax (Mitchill). American smelt. Green's creek (Leda clay), near Ottawa, Ontario.

Artediellus uncinatus (Reinhardt). Sculpin. Near Green's creek (Leda clay), near Ottawa, Ontario.

Cyclopterus lumpus, Linn. Lumpfish; Lump Sucker. Green's creek (Leda clay), near Ottawa, Ontario.

Gasterosteus bispinosus, Walbaum. Common eastern stickleback. Green's creek (Leda clay), near Ottawa, Ontario.

Class AVES.

Feathers. Green's creek (Leda clay), near Ottawa, Ontario.

Bones: not determined. Leda clay, Montreal, Quebec.

Class MAMMALIA.

Delphinapterus leucas, Pallas. White whale. Jacquet river, New Brunswick; and St. Lawrence valley.

Megaptera boöps (Linn.). Humpback whale. Smith falls, Ontario.

Mastodon americanus (Cuvier). Cape Breton island; region south of James bay; southern Ontario; and Manitoba.

Elephas primigenius, Blumenback. Region round Hudson bay; southern Ontario; Alberta; British Columbia; and Yukon. A tooth from near Edmonton, Alberta, has been referred to *E. columbi*,¹ Falconer, as well as to *E. primigenius*, the former species being considered by some authorities as a variety of the latter rather than as a distinct species.

Cervus canadensis, Erxleben. Near Hamilton, Ontario.

Ovibos moschatus (Zimmermann). Musk-ox. Alberta; and Yukon (Upper Porcupine river).

Bison crassicornis, Richardson. Klondyke, and Upper Porcupine river, Yukon.

Castor canadensis, Kuhl. American beaver. Near Hamilton, Ontario.

Phoca granlandica (Müller). Greenland seal; Harp seal. Leda clay, Montreal, Hull, and Ottawa.

¹ Dr. Robert Bell, in his admirable paper "On the occurrence of Mammoth and Mastodon remains around Hudson Bay," (Bull. Geol. Soc. Am., vol. 9, p. 369, 1898), mentions this tooth as apparently belonging to *E. columbi*.

SPECIES ARRANGED ZOOLOGICALLY.

CLASS AGNATHA.

SUBCLASS OSTRACODERMI.

ORDER HETEROSTRACI.

PTERASPIDÆ.

- 48—52. *Cyathaspis acadica* (Matthew). 1886. Silurian. New Brunswick.

ORDER OSTEOSTRACI.

CEPHALASPIDÆ.

73. *Cephalaspis campbelltonensis*, Whiteaves. 1881. Lower Devonian. New Brunswick.
 85. *Cephalaspis* sp. 1892. Lower Devonian. New Brunswick.
 39. *Cephalaspis dawsoni*, Lankester. 1870. Lower Devonian. Gaspé, Quebec.
 67. *Cephalaspis jexi*, Traquair. 1893. Lower Devonian, Campbellton, New Brunswick.
 66. *Cephalaspis laticeps*, Traquair. 1890. Upper Devonian. Scaumenac bay, Quebec.

EUPHANEROPIDÆ.

87. *Euphaneropus longævus*, A. S. Woodward. 1900. Upper Devonian. Scaumenac bay, Quebec.

ORDER ANTIARCHI.

ASTEROLEPIDÆ.

69. *Bothriolepis canadensis*, Whiteaves. 1880. Upper Devonian. Scaumenac bay, Quebec.

CLASS PISCES.

SUBCLASS ELASMOBRANCHII.

ORDER ICHTHYOTOMI.

PLEURACANTHIDÆ.

17. *Dittodus acinaces* (Dawson). 1860. Carboniferous, Coal Measures. Nova Scotia.
 17. *Dittodus penetrans* (Dawson). 1860. Carboniferous, Coal Measures. Nova Scotia.
 85. *Protodus jexi*, A. S. Woodward. 1892. Lower Devonian. New Brunswick.
 85, 67. *Doliodus problematicus* (A. S. Woodward). 1892. Lower Devonian. New Brunswick.

ORDER ACANTHODII.

DIPLACANTHIDÆ.

70. *Diplacanthus striatus*, Agassiz. 1844. Upper Devonian. Scaumenac bay, Quebec.
 86. *Diplacanthus horridus*, A. S. Woodward. 1892. Upper Devonian. Scaumenac bay, Quebec.

73. 77. 85. *Climatius latispinosus* (Whiteaves). 1881. Lower Devonian, New Brunswick.
73. 77. 88. Spine of ? *Acanthodian* fish (*Homacanthus gracilis*, Whiteaves, 1889). Lower Devonian. New Brunswick.

ACANTHODIDÆ.

76. *Acanthodes affinis*, Whiteaves. 1887. Upper Devonian. Scaumenac bay, Quebec.
76. *Acanthodes concinnus*, Whiteaves. 1887. Upper Devonian. Scaumenac bay, Quebec.
85. *Acanthodes semistriatus*, A. S. Woodward. 1892. Lower Devonian. New Brunswick.
- Cheiracanthus costellatus* (Traquair), 1884. Lower Devonian. New Brunswick.

ORDER SELACHII.

SUBORDER ASTEROSPONDYLI.

LAMNIDÆ.

83. *Lamna appendiculata* (Agassiz). 1843. Cretaceous. Nanaimo group. Vancouver island.
79. *Lamna manitobensis*, Whiteaves. 1889. Cretaceous. Nio-brara-Benton. Manitoba.
83. Asterospondylic vertebræ, of which one is thought to belong to the *Carchariidæ*. 1903. Cretaceous, Nanaimo group. Vancouver island.
79. Selachian tooth. 1889. Cretaceous, Fort Pierre group. Saskatchewan.
79. Pectoral fin of a large Selachian. 1889. Cretaceous, Fort Pierre group. Assiniboia.

SUBORDER TECTOSPONDYLI.

PETALODONTIDÆ.

20. *Ctenoptychius cristatus*, Dawson. 1868. Carboniferous, Coal Measures. Nova Scotia.

PSAMMODONTIDÆ.

20. *Psammodus* sp. ? 1868. Carboniferous, Coal Measures. Nova Scotia.

MYLIOBATIDÆ.

79. *Ptychodus parvulus*, Whiteaves. 1889. Cretaceous, Nio-brara-Benton. Manitoba.
36. *Myledaphus bipartitus*, Cope. 1876. (The position of this genus, doubtfully referred by Cope to the Rays, is uncertain.) Cretaceous, Belly River series, Alberta.

SUBCLASS HOLOCEPHALI.

ORDER CHIMÆROIDEI.

PTYCTODONTIDÆ.

80. *Ptyctodus calceolus*, Newberry and Worthen. 1866. Upper Devonian. Manitoba and Ontario.

80. *Rhynchodus* sp. undt. 1892. Upper Devonian, Manitoba.

ICHTHYODORULITES.

Machæracanthus peracutus, Newberry. 1857. Devonian (Corniferous). Ontario.

39. *Machæracanthus sulcatus*, Newberry. 1857. Devonian (Corniferous), Ontario; and Lower Devonian, Gaspé, Quebec.

20. *Gyracanthus duplicatus*, Dawson. 1868. Carboniferous, Coal Measures. Nova Scotia.

66. *Gyracanthus incurvus*, Traquair. 1890. Lower Devonian. New Brunswick.

20. *Gyracanthus magnificus*, Dawson. 1868. Lower Carboniferous. Cape Breton island.

SUBCLASS DIPNOI.

ORDER SIRENOIDEI.

DIPTERIDÆ.

20. *Conchodus plicatus*, Dawson. 1868. Carboniferous, Coal Measures. Nova Scotia.

PHANEROPLEURIDÆ.

71. 68. *Scaumenacia curta* (Whiteaves). 1881. Upper Devonian. Scaumenac bay, Quebec.

ORDER ARTHIRODIRA.

86. 68. *Coccosteus canadensis*, A. S. Woodward. 1892. Upper Devonian. Scaumenac bay, Quebec.

73. 66. *Phlyctænaspis acadica* (Whiteaves). 1881. Lower Devonian. New Brunswick.

80. *Aspidiethys* ? *notabilis*, Whiteaves. 1892. Upper Devonian. Manitoba and Ontario.

80. *Dinichthys canadensis*, Whiteaves. 1892. Upper Devonian. Manitoba.

78. ? *Macropetalichthys sullivanti*, Newberry. 1857. Devonian (Corniferous). Ontario.

SUBCLASS TELEOSTOMI.

ORDER CROSSOPTERYGII.

SUBORDER RHIPIDISTIA.

HOLOPTYCHIIDÆ.

77. 68. 88. *Holoptychius quebecensis* (Whiteaves). 1889. Upper Devonian. Scaumenac bay, Quebec.

81. *Dendrodus arisaigensis*, Whiteaves. 1898. Silurian. Nova Scotia.

RHIZODONTIDÆ.

19. *Rhizodus lancifer* ? Newberry. 1856. Carboniferous, Coal Measures. Nova Scotia.
31. *Strepsodus dawsoni*, Hay. 1900. Carboniferous, Coal Measures. Nova Scotia.
20. 31. *Strepsodus hardingi* (Dawson). 1868. Lower Carboniferous. Nova Scotia.
68. 70. *Eusthenopteron foordi*, Whiteaves. 1881. Upper Devonian. Scaumenac bay, Quebec.

OSTEOLEPIDÆ.

72. 73. *Parabatrachus maxillaris* (Agassiz). 1843. Carboniferous. Coal Measures. Cape Breton island.

ONYCHODONTIDÆ.

- Onychodus sigmoides*, Newberry. 1857. Devonian (Carboniferous). Ontario.
80. *Onychodus* sp. undt. 1892. Upper Devonian. Manitoba.

ORDER ACTINOPTERYGII.

SUBORDER CHONDROSTEI.

PALÆONISCIDÆ.

71. *Cheirolepis canadensis*, Whiteaves. 1881. Upper Devonian. Scaumenac bay, Quebec.
33. *Rhadinichthys alberti* (Jackson). 1851. Lower Carboniferous. New Brunswick.
33. *Rhadinichthys cairnsii* (Jackson). 1851. Lower Carboniferous. New Brunswick.
26. *Rhadinichthys modulus* (Dawson). 1877. Lower Carboniferous. New Brunswick.
33. *Elonichthys browni* (Jackson). 1851. Lower Carboniferous. New Brunswick.
20. *Acrolepis* ? *hortonensis*, Dawson. 1868. Lower Carboniferous. New Brunswick.

ACIPENSERIDÆ.

36. *Acipenser albertensis*, Lambe. 1902. Cretaceous, Belly River series. Alberta.

SUBORDER PROTOSPONDYLI.

AMIDÆ.

10. *Amia macrospondyla*, Cope. 1891. Oligocene. Assiniboia.
10. *Amia whiteavesiana*, Cope. 1891. Oligocene. Assiniboia.

SUBORDER AËTHEOSPONDYLI.

LEPIDOSTEIDÆ.

36. *Lepidosteus occidentalis* (Leidy). 1856. Cretaceous. Belly River series. Alberta.
3. 4. *Lepidosteus* (Clastes) sp. 1875. Cretaceous, Belly River series. Assiniboia.

SUBORDER ISOSPONDYLI.

SALMONIDÆ.

29. *Salmo salar* ? Linn. 1758. Pleistocene. Quebec.

ARGENTINIDÆ.

41. *Mallotus villosus* (Müller). 1777. Pleistocene. Ontario.
29. *Osmerus mordax* (Mitchill). 1815. Pleistocene. Ontario.

ENCHODONTIDÆ.

79. *Enchodus shumardi*, Leidy. 1856. Cretaceous, Niobrara-Benton. Manitoba.

SUBORDER PLECTOSPONDYLI.

CYPRINIDÆ.

12. *Amyzon brevipinne*, Cope. 1893. Tertiary (? Oligocene).
British Columbia.
Amyzon sp. Tertiary (? Oligocene). British Columbia.

SUBORDER NEMATOGNATHI.

SILURIDÆ.

36. *Rhineastes eruciferus* (Cope). 1876. Cretaceous, Belly
River series. Alberta.
10. *Rhineastes rhæas*, Cope. 1891. Oligocene. Assiniboia.
10. ? *Rhineastes*, Cope. 1872. Oligocene. Assiniboia. (Ver-
tebræ).
10. *Amiurus cancellatus*, Cope. 1891. Oligocene. Assiniboia.
10. *Amiurus macconnelli*, Cope. 1891. Oligocene. Assiniboia.

SUBORDER PERCESOCES.

MUGILIDÆ.

79. *Cladocycus occidentalis*, Leidy. 1856. Cretaceous, Niobrara-Benton. Manitoba.

SUBORDER PERCOMORPHI.

COTTIDÆ.

29. *Artediellus uncinatus* (Reinhardt). 1833. Pleistocene.
Ontario.

CYCLOPTERIDÆ.

29. *Cyclopterus lumpus*, Linn. 1788. Pleistocene. Ontario.

SUBORDER HEMIBRANCHII.

GASTEROSTEIDÆ.

29. *Gasterosteus bispinosus*, Walbaum. 1792. Pleistocene.
Ontario.
83. Vertebræ of a Hemibranch. 1903. Cretaceous. Nanaimo
group. Vancouver island.

OF UNCERTAIN POSITION.

36. *Diphiodus longirostris*, Lambe. 1902. Cretaceous, Belly River series. Alberta.

CLASS AMPHIBIA.

SUBCLASS STEGOCEPHALIA.

ORDER LEPOSONDYLI.

SUBORDER BRANCHIOSAURIA.

PROTRITONIDÆ.

27. *Sparodus* sp. undt. 1882. Carboniferous, Coal Measures. Nova Scotia.

SUBORDER MICROSAURIA.

HYLONOMIDÆ.

27. *Hylonomus latidens*, Dawson. 1882. Carboniferous, Coal Measures. Nova Scotia.
16. *Hylonomus lyelli*, Dawson. 1859. Carboniferous, Coal Measures. Nova Scotia.
27. *Hylonomus multidens*, Dawson. 1882. Carboniferous, Coal Measures. Nova Scotia.
16. *Hylonomus wymani*, Dawson. 1859. Carboniferous, Coal Measures. Nova Scotia.
16. *Smilerpeton aciededentatum*, Dawson. 1859. Carboniferous, Coal Measures. Nova Scotia.
65. *Hylerpeton dawsoni*, Owen. 1862. Carboniferous. Coal Measures. Nova Scotia.
30. *Hylerpeton intermedium*, Dawson. 1895. Carboniferous, Coal Measures. Nova Scotia.
25. *Hylerpeton longidentatum*, Dawson. 1876. Carboniferous, Coal Measures. Nova Scotia.
25. *Fritschia curtidentata*, Dawson. 1876. Carboniferous, Coal Measures. Nova Scotia.
27. *Amblyodon problematicus*, Dawson. 1882. (A lepospondylous genus of uncertain position.) Carboniferous, Coal Measures. Nova Scotia.

ORDER LABYRINTHODONTIA.

DENDRERPETONTIDÆ.

63. *Dendrerpeton acadianum*, Owen. 1853. Carboniferous, Coal Measures. Nova Scotia.
18. *Dendrerpeton oweni*, Dawson. 1863. Carboniferous, Coal Measures. Nova Scotia.
21. *Baphetes minor*, Dawson. 1869. Carboniferous, Coal Measures. Nova Scotia.
64. *Baphetes planiceps*, Owen. 1853. Carboniferous, Coal Measures. Nova Scotia.
30. *Platystegos loricatum*, Dawson. 1895. Carboniferous, Coal Measures. Nova Scotia.

ANTHRACOSAURIDÆ.

45. *Eosaurus acadianus*, Marsh. 1862. (Position uncertain.)
Carboniferous, Coal Measures. Nova Scotia.

SUBCLASS BATRACHIA.

ORDER URODELA (CAUDATA).

36. *Scapherpeton tectum*, Cope. 1876. Cretaceous, Belly River series. Alberta.

ICHNITES.

54. *Asperipes avipes*, Matthew. 1903. Carboniferous, Coal Measures. Nova Scotia.
54. *Asperipes* sp. 1903. Carboniferous, Coal Measures. Nova Scotia.
18. 27. 54. 55. *Asperipes* (*Hylopus*) *caudifer* (Dawson). (1863) 1882. Carboniferous, Coal Measures. Nova Scotia.
30. 54. *Ornithoides* (*Hylopus* ?) *trifidus* (Dawson). 1895. Carboniferous, Coal Measures. Nova Scotia.
18. 27. 55. *Hylopus hardingi*, Dawson. (1863) 1882. Lower Carboniferous. Nova Scotia.
18. 27. 55. *Hylopus logani*, Dawson. (1863) 1882. Lower Carboniferous. Nova Scotia.
30. *Hylopus minor*, Dawson. 1895. Carboniferous, Coal Measures. Nova Scotia.
30. *Hylopus* sp. undt. 1895. Carboniferous, Coal Measures. Nova Scotia.
30. *Hylopus* ? sp. 1895. Carboniferous. Coal Measures. Nova Scotia.
27. *Palæosauropus antiquior* (Dawson). 1882. Lower Carboniferous. Nova Scotia.
20. 54. *Baropezia* (*Sauropus*) *sydnensis* (Dawson). 1868. Carboniferous, Coal Measures. Cape Breton island, Nova Scotia.
54. *Baropezia* sp. 1903. Carboniferous, Coal Measures. Cape Breton island, Nova Scotia.
54. *Megopezia pineoi*, Matthew. 1903. Lower Carboniferous. Nova Scotia.
24. 54. 55. *Pseudobradypus* (*Sauropus*) *unguifer* (Dawson). 1872. Carboniferous, Millstone Grit. Nova Scotia.
53. 55. *Thenaropus* ? *macnaughtoni*, Matthew. 1903. Carboniferous, Coal Measures. Nova Scotia.
53. 54. 55. *Barillopus unguifer*, Matthew. 1903. Carboniferous, Coal Measures. Nova Scotia.
54. *Barillopus* sp. 1903. Carboniferous, Coal Measures. Nova Scotia.
54. *Barillopus* sp. 1903. Carboniferous, Coal Measures. Nova Scotia.
53. 55. *Dromillopus celer*, Matthew. 1903. Carboniferous Coal Measures. Nova Scotia.

54. *Cursipes dawsoni*, Matthew. 1903. Carboniferous, Coal Measures. Nova Scotia.
54. *Cursipes* sp. 1903. Carboniferous, Coal Measures. Nova Scotia.

CLASS REPTILIA.

SUBCLASS SYNAPSIDA.

ORDER SAUROPTERYGIA.

PLESIOSAURIDÆ.

30. *Cimoliasaurus magnus*, Leidy. 1851. Cretaceous, Belly River series. Alberta.

ORDER CHELONIA.

SUBORDER PLEURODIRA.

PLEUROSTERNIDÆ.

3. 4. *Compsemys ? victus*, Leidy. 1856. Cretaceous, Belly River series, Assiniboia.
36. *Baëna hatcheri*, Hay. 1901. Cretaceous, Belly River series. Alberta.
36. *Baëna antiqua*, Lambe. 1902. Cretaceous, Belly River series. Alberta.

SUBORDER CRYPTODIRA.

ADOCIDÆ.

- 36 *Adocus lineolatus*, Cope. 1874. Cretaceous, Belly River series. Alberta.
3. 4. 34. 36. *Basilemys variolosus* (Cope). 1876. Cretaceous, Belly River series. Alberta.

CHELYDRIDÆ.

- 36 *Neurankylus eximius*, Lambe. 1902. Cretaceous, Belly River series. Alberta.

TESTUDINIDÆ.

10. ? *Stylemys nebrascensis*, Leidy. 1851. Oligocene. Assiniboia.

SUBORDER TRIONYCHIA.

PLASTOMENIDÆ.

- 3 4. *Plastomenus costatus*, Cope. 1875. Cretaceous, Belly river series. Assiniboia.

TRIONYCHIDÆ.

35. 36. *Trionyx foveatus*, Leidy. 1856. Cretaceous, Belly River series. Alberta.
10. *Trionyx leucopotamicus*, Cope. 1891. Oligocene. Assiniboia.
3. 4. 35. 36. *Trionyx vagans*, Cope. 1874. Cretaceous, Belly River series. Assiniboia and Alberta.
3. 4. *Trionyx* sp. 1875. Cretaceous, Belly River series. Assiniboia.

SUBCLASS DIAPSIDA.

ORDER CHORISTODERA.

CHAMPSOSAURIDÆ.

36. *Champsosaurus annectens*, Cope. 1876. Cretaceous, Belly River series. Alberta.

ORDER DINOSAURIA.

SUBORDER THEROPODA.

ANCHISAURIDÆ.

40. *Bathyngnathus borealis*, Leidy. 1854. Triassic. Prince Edward island.
- Arctosaurus osborni*, Adams. 1875. Mesozoic. Bathurst island, District of Franklin.

MEGALOSAURIDÆ.

36. *Deinodon horridus*, Leidy. 1856. Cretaceous, Belly River series. Alberta.
36. *Deinodon explanatus* (Cope). 1876. Cretaceous, Belly River series. Alberta.
11. 36. 37. *Dryptosaurus incrassatus* (Cope). 1876. Cretaceous. Edmonton series. Alberta.

ORNITHOMIMIDÆ.

36. 38. *Ornithomimus altus*, Lambe. 1902. Cretaceous, Belly River series, Alberta.

SUBORDER ORTHOPODA.

STEGOSAURIDÆ.

36. *Palæoscincus asper*, Lambe. 1902. Cretaceous, Belly River series. Alberta.
36. *Palæoscincus costatus*, Leidy. 1856. Cretaceous, Belly River series, Alberta.
36. 57. *Stereocephalus tutus*, Lambe. 1902. Cretaceous, Belly River series, Alberta.

CERATOPSIDÆ.

36. *Monoclonius belli*, Lambe. 1902. Cretaceous, Belly River series. Alberta.
36. *Monoclonius canadensis*, Lambe. 1902. Cretaceous, Belly River series, Alberta.
- 36 *Monoclonius dawsoni*, Lambe. 1902. Cretaceous, Belly River series, Alberta.
- 36 57. *Stegoceras validus*, Lambe. 1902. Cretaceous, Belly River series. Alberta.

TRACHODONTIDÆ.

36. *Trachodon altidens*, Lambe, 1902. Cretaceous, Belly River series. Alberta.
36. *Trachodon marginatus*, Lambe. 1902. Cretaceous, Belly River series. Alberta.
36. *Trachodon selwyni*, Lambe. 1902. Cretaceous, Belly River series. Alberta.
3. 4. ? *Trachodon* ? sp. 1875. Cretaceous, Belly River series. Assiniboia.
3. 4. *Cionodon stenopsis*, Cope. 1875. Cretaceous, Belly River series. Assiniboia.

ORDER SQUAMATA.

SUBORDER LACERTILIA.

36. *Troödon formosus*, Leidy. 1856. Provisionally referred to the *Lacertilia*. Cretaceous, Belly River series. Alberta.

ORDER CROCODYLIA.

SUBORDER EUSUCHIA.

CROCODYLIDÆ.

36. *Crocodylus humilis*, Leidy. 1856. Cretaceous, Belly River series. Alberta.
36. *Bottosaurus perrugosus*, Cope. 1874. Cretaceous, Belly River series. Alberta.

CLASS AVES.

SUBCLASS ORNITHURÆ.

SUBORDER EUORNITHES.

ORDER STEGANOPODES.

PELECANIDÆ.

13. *Cyphornis magnus*, Cope. 1894. Tertiary. Vancouver island. (Position of genus uncertain.)

ADDITIONAL REMAINS OF BIRDS.

29. Feathers. 1881. Pleistocene. Ontario.
41. Bones. 1863. Pleistocene. Quebec.

CLASS MAMMALIA.

SUBCLASS PROTOTHERIA.

ORDER MULTITUBERULATA.

PLAGIAULACIDÆ.

36. *Ptilodus primævus*, Lambe. 1902. Cretaceous, Belly River series. Alberta.

SUBCLASS EUTHERIA.

ORDER CETACEA.

SUBORDER ODONTOCETI.

DELPHINIDÆ.

28. *Delphinapterus leucas* (Pallas). 1776. (Beluga catodon.) Pleistocene. New Brunswick and St. Lawrence river valley.

SUBORDER MYSTACOCETI.

BALÆNIDÆ.

28. *Megaptera boöps* (Linn.). 1758. (*M. longimana*.) Pleistocene. Ontario.

ORDER UNGULATA.

SUBORDER PROBOSCIDEA.

ELEPHANTIDÆ.

15. *Mastodon americanus* (Cuvier). 1798. Pleistocene. Cape Breton island; region south of James bay; southern Ontario; and Manitoba.
41. 14. *Elephas primigenius*, Blumenbach. 1803. Pleistocene. Region round Hudson Bay; southern Ontario; Alberta; British Columbia; Yukon.

SUBORDER PERISSODACTYLA.

EQUIDÆ.

8. 10. *Meshippus westoni* (Cope). 1891. Oligocene. Assiniboia.
- TITANOTHERIIDÆ (BRONTOTHERIIDÆ).
7. 8. 10. *Megacerops angustigenis* (Cope). 1886. Oligocene. Assiniboia.
10. *Megacerops coloradensis*? Leidy. 1870. (*M. americanus*, *M. proutii*.) Oligocene. Assiniboia.
9. 10. *Megacerops selwynianus* (Cope). 1889. Oligocene. Assiniboia.
9. 10. ? *Symborodon acer*, Cope. 1873. (*S. syceras*.) Oligocene. Assiniboia.

HYRACODONTIDÆ.

Hyracodon nebrascensis, Leidy. 1850. (Type of *Aceratherium pumilum*, Cope). Oligocene. Assiniboia.

RHINOCEROTIDÆ.

6. 7. 8. 10. *Aceratherium mite*, Cope. 1874. (*Cænopus pumilus*). Oligocene. Assiniboia.
10. *Aceratherium occidentale* (Leidy). 1851. Oligocene. Assiniboia.

SUBORDER ARTIODACTYLA.

SUIDÆ.

8. 9. 10. *Elotherium coarctatum*, Cope. 1889. Oligocene. Assiniboia.

AGRIOTHERIDÆ.

7. 8. ? *Oreodon*, Leidy. 1851. Oligocene. Assiniboia.
8. 10. *Leptomeryx esulcatus*, Cope. 1889. Oligocene. Assiniboia.
6. 7. 8. 10. *Leptomeryx mammifer*, Cope. 1886. Oligocene. Assiniboia.
8. 10. *Leptomeryx semicinctus*, Cope. 1889. Oligocene. Assiniboia.

CAMELIDÆ.

8. 10. *Hypertragulus transversus*, Cope. 1889. Oligocene. Assiniboia.

CERVIDÆ.

41. *Cervus canadensis*, Erxleben. 1777. Pleistocene. Ontario.

BOVIDÆ.

- 14 *Ovibos moschatus* (Zimmermann). 1780. Pleistocene, Alberta and British Columbia.
42. 84. *Bison crassicornis*, Richardson. 1854. Pleistocene. Yukon.

ORDER ANCYLOPODA.

CHALICOTHERIIDÆ.

8. 10. *Chalicotherium bilobatum*, Cope. 1889. Oligocene. Assiniboia.

ORDER GLIRES (RODENTIA).

SUBORDER SIMPLICIDENTATA.

CASTORIDÆ.

41. *Castor canadensis*, Kuhl. 1820. Pleistocene. Ontario.

SUBORDER DUPLICIDENTATA.

LEPORIDÆ.

8. 10. *Palæolagus turgidus*, Cope. 1873. Oligocene. Assiniboia.

ORDER CARNIVORA.

SUBORDER CREODONTA.

HYÆNODONTIDÆ.

6. 7. 8. 10. *Hemipsalodon grandis*, Cope. 1885. Oligocene. Assiniboia.

SUBORDER PINNIPEDIA.

PHOCIDÆ.

41. 29. *Phoca grænlandica* (Müller). 1776. Pleistocene. Quebec and Ontario.

OF UNCERTAIN POSITION.

36. *Boreodon matutinus*, Lambe. 1902. Cretaceous, Belly River series. Alberta. According to Hatcher, probably referable to the Marsupialia.

BIBLIOGRAPHY.

Giving the more important references to species found in Canada.

1. ADAMS, A. L. 1875. "On a fossil saurian vertebra (*Arctosaurus osborni*) p. 177.
2. ADAMS, A. L. 1877. "A fossil saurian from the arctic regions," Amer. Jour. Sci., (3), vol. xiii, p. 316.
3. COPE, E. D. 1875. "On the transition beds of the Saskatchewan district," Proc. Acad. Nat. Sci., Philadel., vol. xxvii, p. 9.
4. COPE, E. D. 1875. "Report on the vertebrate fossils from the Fort Union group of Milk river," appendix B. to "Report on the geology and resources of the region in the vicinity of the forty-ninth parallel," by G. M. Dawson. (British North American Boundary Commission).
5. COPE, E. D. 1875. "The vertebrata of the Cretaceous formations of the west," Report U. S. Geol. Surv. of the Territories, vol. ii.
6. COPE, E. D. 1885. "The White River beds of Swift Current river North-west Territory," Amer. Naturalist, vol. xix, p. 163.
7. COPE, E. D. 1886. "The vertebrata of the Swift Current creek region of the Cypress hills," appendix to "Report on the Cypress hills, Wood mountain and adjacent country," by R. G. McConnell, Geol. and Nat. Hist. Surv. of Canada, annual report (new series), vol. i, 1885. (1886.)
8. COPE, E. D. 1889. "The vertebrata of the Swift Current river," ii, Amer. Naturalist, vol. xxiii, p. 151.
9. COPE, E. D. 1889. "The vertebrata of the Swift Current river," iii, Amer. Naturalist, vol. xxiii, p. 628.
10. COPE, E. D. 1891. "On vertebrata from the Tertiary and Cretaceous rocks of the North-west Territory." "The species from the Oligocene or Lower Miocene beds of the Cypress hills," Geol. Surv. of Canada, Contr. to Can. Palæon., vol. iii (quarto), part I.

11. COPE, E. D. 1892. "On the skull of the Dinosaurian *Laelaps incressatus*, Cope," Proc. Am. Phil. Soc., vol. xxx, p. 240.
12. COPE, E. D. 1893. "Fossil fishes from British Columbia," Proc. Acad. Nat. Sci., Philadel., vol. xlv, p. 401.
13. COPE, E. D. 1894. "On Cyphornis, an extinct genus of birds," Jour. Acad. Nat. Sci., Philadel., (2), vol. ix, p. 451.
14. DAWSON, G. M. 1899. "Geol. Surv. of Canada, summary report for 1898, p. 19.
15. DAWSON, J. W. 1855. Acadian Geology, p. 57.
16. DAWSON, J. W. 1859. "On a terrestrial mollusk, a chilognathous myriapod, and some new species of reptiles from the Coal-measures of Nova Scotia," Quart. Jour. Geol. Soc., London, vol. xvi.
17. DAWSON, J. W. 1860. Acadian Geology, suppl. chapter.
18. DAWSON, J. W. 1863. "The air breathers of the Coal period of Nova Scotia," Canadian Naturalist and Geologist, vol. viii.
19. DAWSON, J. W. 1863. "Air-breathers of the Coal period," Amer. Jour. Sci. and Arts., (2), vol. xxxvi, p. 430.
20. DAWSON, J. W. 1868. Acadian Geology, second edition.
21. DAWSON, J. W. 1869. "Note on some new animal remains from the Carboniferous and Devonian of Canada," Quart. Jour. Geol. Soc., London, vol. xxvi, p. 166.
22. DAWSON, J. W. 1870. Ibid. Canadian Naturalist, (2), vol. v, p. 98.
23. DAWSON, J. W. 1870. Ibid. Geological Magazine, vol. vii, p. 87.
24. DAWSON, J. W. 1872. "Notes on footprints from the Carboniferous of Nova Scotia, in the collections of the Geological Survey of Canada," Geological Magazine, vol ix, p. 251.
25. DAWSON, J. W. 1876. "On a recent discovery of Carboniferous batrachians in Nova Scotia," Amer. Jour. Sci. and Arts, (3) vol. vii, p. 444.
26. DAWSON, J. W. 1877. "Lower Carboniferous fishes of New Brunswick," Canadian Naturalist, (2), vol. viii, p. 337.
27. DAWSON, J. W. 1882. "On the results of recent explorations of erect trees containing animal remains in the Coal formation of Nova Scotia," Phil. Trans. Royal Soc., London, vol. clxxiii, pt. ii, p. 621.
28. DAWSON, J. W. 1883. "On portions of the skeleton of a whale from gravel on the line of the Canadian Pacific railway, near Smiths falls, Ontario," Amer. Jour. Sci., (3), vol. xxv., p. 200; and Canadian Naturalist, (2), vol. x, p. 385.
29. DAWSON, J. W. 1893. The Canadian Ice Age, p. 265, Peter Redpath Museum, McGill University, Montreal.
30. DAWSON, J. W. 1895. "Synopsis of the air-breathing animals of the Palæozoic in Canada up to 1894," Trans. Royal Soc. of Canada for 1894, section iv., p. 71.
31. HAY, O. P. 1900. "Descriptions of some vertebrates of the Carboniferous age," Proc. Amer. Phil. Soc., vol. xxxix, p. 96.
32. HAY, O. P. 1902. Bibliography and Catalogue of the fossil vertebrata of North America, Bull. U. S. Geol. Surv. No. 179. Dept. of the Interior, Washington.
33. JACKSON, C. T. 1851. "Descriptions of the fossil fishes of the Albert coal mine," Report on the Albert coal mine, etc., Boston.

34. LAMBE, L. M. 1901. "Notes on a turtle from the Cretaceous rocks of Alberta," *Ottawa Naturalist*, vol. xv, p. 63.
35. LAMBE, L. M. 1902. "On *Trionyx foveatus*, Leidy, and *Trionyx vagans*, (Cope), *Ottawa Naturalist*, vol. xvii, p. 133.
Canada, summary report for 1901, p. 81.
36. LAMBE, L. M. 1902. "On vertebrata of the Mid-Cretaceous of the North-west Territory," by Henry Fairfield Osborn and Lawrence M. Lambe. (1) Distinctive characters of the Mid-Cretaceous fauna, by H. F. Osborn, (2) New genera and species from the Belly River series, by L. M. Lambe; *Geol. Surv. of Canada, Contr. to Can. Paleon.*, vol. iii (quarto), part ii.
37. LAMBE, L. M. 1903. "On the lower jaw of *Dryptosaurus incrassatus*, (Cope), *Ottawa Naturalist*, vol. xvii, p. 133.
38. LAMBE, L. M. 1904. "On the grasping power of the manus of *Ornithomimus altus*, Lambe," *Ottawa Naturalist*, vol. xviii, p. 33.
39. LANKESTER, E. R. 1870. "On a new *Cephalaspis* discovered in America," etc., *Geological Magazine*, vol. vii, p. 397.
40. LEIDY, J. 1854. "On *Bathygnathus borealis*, an extinct saurian of the New Red sandstone of Prince Edward island," *Jour. Acad. Nat. Sci., Philadel.*, (2), vol. ii, p. 327.
41. LOGAN, W. E. 1863. *Geol. Surv. of Canada, Report of progress from its commencement to 1863.*
42. LYDEKKER, R. 1885. *Catalogue of the fossil mammalia in the British Museum*, part ii.
43. LYDEKKER, R. 1889. "Notes on new and other dinosaurian remains," *Geological Magazine*, (3), vol. vi, p. 352.
44. LYDEKKER, R. 1890. *Catalogue of the fossil reptilia and amphibia in the British Museum*, part iv.
45. MARSH, O. C. 1862. "On the saurian vertebræ from Nova Scotia," *Amer. Jour. Sci. and Arts*, (2), vol. xxxiii, p. 278.
46. MARSH, O. C. 1862. "Description of the remains of a new Enaliosaurian (*Eosaurus acadianus*) from the Coal formation of Nova Scotia," *ibid*, vol. xxxiv, p. 1; and *Canadian Naturalist and Geologist*, vol. vii, p. 205.
47. MARSH, O. C. 1863. "Abstract of the above." *Quart. Jour. Geol. Soc., London*, vol. xix, p. 52.
48. MATTHEW, G. F. 1886. "Discovery of a Pteraspidian fish in the Silurian rocks of New Brunswick," *Canadian Record of Science*, vol. ii, p. 251.
49. MATTHEW, G. F. 1887. "Additional note on the Pteraspidian fish found in New Brunswick," *ibid*, vol. ii, p. 323.
50. MATTHEW, G. F. 1887. "A preliminary notice of a new genus of Silurian fishes," *Bull. Nat. Hist. Soc., New Brunswick*, vol. vi, p. 69.
51. MATTHEW, G. F. 1888. "On some remarkable organisms of the Silurian and Devonian rocks in southern New Brunswick," *Trans. Royal Soc. of Canada*, vol. vi, section iv, p. 49.
52. MATTHEW, G. F. 1891. Letter regarding age of Silurian fish (*Diplaspis acadica*), *American Geologist*, vol. viii, p. 61.
53. MATTHEW, G. F. 1903. "On batrachian and other footprints from the Coal Measures of Joggins, N.S.," *Bull. Nat. Hist. Soc., New Brunswick*, vol. v, p. 103.

54. MATTHEW, G. F. 1903. "New genera of Batrachian Footprints of the Carboniferous System in Eastern Canada," Canadian Record of Science, vol. ix, No. 2, p. 99.
55. MATTHEW, G. F. 1904. "An attempt to classify Palæozoic Batrachian footprints," Trans. Royal Soc. of Canada, vol. ix, section iv, p. 109.
56. MATTHEW, W. D. 1903. "The Fauna of the Titanotherium Beds of Pipestone Springs, Montana," Bulletin Amer. Mus. Nat. Hist., vol. xix, article vi, p. 197.
57. NOPCSA, F. B. 1903. "Ueber Stegoceras und Stereoccephalus," Centralblatt f. Mineralogie, Geologie u. Paläontologie, No. 8.
58. OSBORN, H. F. 1896. "The Cranial Evolution of Titanotherium," Bulletin Amer. Mus. Nat. Hist., vol. viii, article ix, p. 157.
59. OSBORN, H. F. 1898. "The Extinct Rhinoceroses," Memoirs Amer. Mus. Nat. Hist., vol. i, pt. iii
60. OSBORN, H. F. 1902. "The Four Phyla of Oligocene Titanotheres," Bulletin Amer. Mus. Nat. Hist., vol. xvi, article viii, p. 91.
61. OSBORN, H. F. 1902. "On vertebrata of the Mid-Cretaceous of the Northwest Territory," see No. 36 of this bibliography.
62. OSBORN, H. F. 1902. "Recent zoopaleontology; New vertebrates of the Mid-Cretaceous," Science, n. s., vol. xvi, p. 673.
63. OWEN, R. 1853. "Notes on the above described fossil remains," Quart. Jour. Geol. Soc., London, vol. ix, p. 66.
64. OWEN, R. 1853. "On a fossil embedded in a mass of Pictou coal from Nova Scotia," *ibid.* vol. x, p. 207.
65. OWEN, R. 1862. "Descriptions of specimens of fossil reptila discovered in the Coal-measures of the South Joggins, Nova Scotia, by Dr. J. W. Dawson," *ibid.* vol. xviii, p. 238.
66. TRAQUAIR, R. H. 1890. "Notes on the Devonian fishes of Scaumenac bay and Campbellton, in Canada," Geological Magazine, (3), vol. vii, p. 15.
67. TRAQUAIR, R. H. 1893. "Notes on the Devonian fishes of Campbellton and Scaumenac bay in Canada," *ibid.* (3), vol. x, p. 145.
68. TRAQUAIR, R. H. 1893. "Notes on the Devonian fishes of Campbellton and Scaumenac bay in Canada," No. 3, *ibid.* (3), vol. x, p. 262; also Amer. Naturalist, vol. xxvii, p. 817 and Proc. Royal Phys. Soc., Edinburgh, vol. xii, p. 111.
69. WHITEAVES, J. F. 1880. "On a new species of *Pterichthys*, allied to *Bothriolepis ornata*, from the Devonian rocks of the north side of the Baie des Chaleurs," Amer. Jour. Sci. and Arts, (3), vol. xx, p. 132.
70. WHITEAVES, J. F. 1881. "On some remarkable fossil fishes from the Devonian rocks of Scaumenac bay, Province of Quebec," *ibid.* (3), vol. xxi, p. 494; and Ann. and Mag. Nat. Hist., (5), vol. viii, p. 159.
71. WHITEAVES, J. F. 1881. "On some remarkable fossil fishes from the Devonian rocks of Scaumenac bay, P.Q., with descriptions of a new genus and three new species," Canadian Naturalist, (2), vol. x, p. 27.
72. WHITEAVES, J. F. 1881. "Description of a new species of *Psammodus* from the Carboniferous rocks of Cape Breton," *ibid.* (2), vol. x, p. 36.
73. WHITEAVES, J. F. 1881. "On some fossil fishes, crustacea and mollusca from the Devonian rocks at Campbellton, N.B., with descriptions of five new species," *ibid.* (2), vol. x, p. 93.

74. WHITEAVES, J. F. 1883. "Recent discoveries of fossil fishes in the Devonian rocks of Canada," Proc. Amer. Ass. Adv. Sci., thirty-first meeting. Montreal, 1882, p. 353.
75. WHITEAVES, J. F. 1883. "Recent discoveries of fossil fishes in the Devonian rocks of Canada," Amer. Naturalist, vol. xvii, p. 158.
76. WHITEAVES, J. F. 1887. "Illustrations of the fossil fishes of the Devonian rocks of Canada," pt. i, Trans. Royal Soc. of Canada, 1886, vol. iv, section iv, p. 101.
77. WHITEAVES, J. F. 1889. "Illustrations of the fossil fishes of the Devonian rocks of Canada," pt. ii, Trans. Royal Soc. of Canada, 1888, vol. vi, section iv, p. 77.
78. WHITEAVES, J. F. 1889. "On some fossils from the Hamilton formation of Ontario, with a list of the species at present known from that formation and province," Geol. Surv. of Canada, Contr. to Can. Palæon., vol. i, pt. ii, (2), p. 92.
79. WHITEAVES, J. F. 1889. "On some Cretaceous fossils from British Columbia, the North West Territory and Manitoba," Geol. Surv. of Canada, Contr. to Can. Palæon., vol. i, pt. ii, (4), p. 151.
80. WHITEAVES, J. F. 1892. "The fossils of the Devonian rocks of the islands, shores or immediate vicinity of Lakes Manitoba and Winnipegosis," Geol. Surv. of Canada, Contr. to Can. Palæon., vol. i, pt. iv, p. 225.
81. WHITEAVES, J. F. 1897. "Note on a fish tooth from the Upper Arisaig series of Nova Scotia," Canadian Record of Science, vol. vii, p. 461; and 1898, Report Brit. Ass. Adv. Sci. for 1897, Toronto meeting, p. 656.
82. WHITEAVES, J. F. 1899. "The Devonian system in Canada," Science, (2), vol. x, p. 402 and 430; and Proc. Amer. Ass. Adv. Sci., vol. xlviii, Columbus meeting, p. 193.
83. WHITEAVES, J. F. 1903. "On some additional fossils from the Vancouver Cretaceous, with a revised list of the species therefrom," Geol. Surv. of Canada, Mesozoic Fossils, vol. i, pt. v, p. 309.
84. WHITEAVES, J. F. 1903. "Cranii of extinct bisons from the Klondyke creek gravels," Ottawa Naturalist, vol. xvi, p. 240.
85. WOODWARD, A. S. 1892. "On the Lower Devonian fish-fauna of Campbellton, New Brunswick," Geological Magazine, (3), vol. viii, p. 1.
86. WOODWARD, A. S. 1892. "Further contributions to knowledge of the Devonian fish-fauna of Canada," (3), vol. ix, p. 481.
87. WOODWARD, A. S. 1900. "On a new ostracoderm (*Euphancrops longævus*) from the Upper Devonian of Scaumenac bay, Province of Quebec, Canada," Ann. and Mag. Nat. Hist., (7), vol. v, p. 416.
88. WOODWARD, A. S. 1889-1901. Catalogue of the fossil fishes in the British Museum, pts. i (1889), ii (1891), iii (1895) and iv (1901).
89. LAMBE, L. M. 1904. "On the squamoso-parietal crest of two species of horned dinosaurs from the Cretaceous of Alberta," Ottawa Naturalist, vol. xviii, p. 81.
90. LAMBE, L. M. 1904. "On the squamoso-parietal crest of the horned dinosaurs *Centrosaurus apertus* and *Monoclonius canadensis*," Trans. Royal Soc. of Canada, second series, vol. x, p. 3.
91. LAMBE, L. M. 1904. "On *Dryptosaurus incrassatus* (Cope), from the Edmonton series of the North-west Territory," Geol. Surv. of Canada, Contr. to Can. Palæon., vol. iii (quarto), part iii.

III.—*Notes on Tertiary Plants from Canada and the United States.*

By D. P. PENHALLOW.

(Read June 23, 1904.)

In continuation of previously recorded studies of undetermined material in the collections of the Peter Redpath Museum,¹ the few remaining specimens have since been determined. For the most part the material was too poorly preserved to admit of precise reference to any particular species, although the genera could be ascertained with a fair measure of certainty in nearly all cases. A few new facts have been brought to light, however, chiefly with reference to a revision of previously assigned characters and the relation of extinct forms to existing types. As in the case of previously described specimens from the same horizons, the material was in all cases highly silicified, and in several instances it showed the effects of advanced decay and modification by compression.

TAXODIUM LARAMIANUM, n. sp.

Laramie formation (Eocene) at Cochrane, Alberta, N.W.T.

Transverse.—Growth rings prominent, rather broad. Summer wood prominent, upwards of 17 tracheids, thick, and passing somewhat gradually into the broad spring wood. Spring tracheids large, squarish-hexagonal, thin-walled, uniform in regular rows. Resin cells obscure, and forming an open zone on the inner face of the summer wood. Resin passages wholly wanting. Medullary rays numerous, narrow, distant about 2-8 rows of tracheids.

Radial.—Medullary rays wholly devoid of tracheids. Ray cells straight, equal to about 3 tracheids; the upper and lower walls rather thick and sparingly pitted; the terminal walls straight or diagonal or sometimes curved, entire; the lateral walls with oval or round pits, about 2-3 per tracheid in radial series. Bordered pits numerous, but becoming 2-rowed toward the summer wood, though distinctly crowded into 2-3 compact rows in the younger spring tracheids. Resin cells not conspicuous.

Tangential.—Resin cells conspicuous but not numerous, about three times longer than broad. Medullary rays rather numerous and narrow, often very high, strictly uniseriate; the cells oval, more rarely round in the low rays.

The specimen to which this diagnosis refers is an undoubted *Taxodium*. The only fossil representatives of the genus with which comparison can be made are *T. distichum*, *T. distichum miocenum* and

¹ Trans. R.S.C., IX., iv., 33.

T. occidentale of Newberry. The latter is known by its foliage only, and it therefore offers no satisfactory means of comparison in the present instance, although reported by Mr. J. B. Tyrrell as occurring in the Paskapoo series of the Calgary region.¹ *T. distichum miocenum* of Heer is also known only through its leafy branches, and there is reason for the belief that it is only a form of the species and not a well marked variety. We are therefore thrown back upon *T. distichum* as offering the only satisfactory point of comparison. As previously recorded,² this tree is known through its wood as occurring in the Eocene of the Great Valley and Porcupine Creek, Assiniboia. If we accept the foliage of *T. distichum miocenum* as representing the species form, then the geographical range becomes a very wide one throughout Eocene and Miocene times, and it is necessary to consider if the present specimen falls within this range, or if it extends it in any way.

A close comparison of the wood of *T. laramianum* and *T. distichum* shows a very close agreement between the two, and in fact the agreement is so close as to establish practical identity, with the exception of one feature, which serves to definitely separate them from one another. In the existing *T. distichum*, as also in its fossil representative, the bordered pits are in one row, though often paired, and thus becoming imperfectly 2-rowed. In *T. laramianum*, on the contrary, the pits are definitely crowded into 2-3 compact rows, a feature which is well defined throughout the spring wood. On the basis which has been adopted for the limitation of species,³ this defines a separate species; while yet further, in accordance with the evidence of recent anatomical studies, we must accept such a structural variation as evidence of a more primitive type of development.⁴ The conclusion to which these facts point is that *T. laramianum* is somewhat more primitive than *T. distichum*, of which it may possibly be the ancestral form, inasmuch as the latter is at present unknown in any formation older than the Eocene. This hypothesis would be fully sustained on geological grounds were the former known to the Cretaceous; but according to Mr. Tyrrell's report on the geology of the Bow river and its tributaries,⁵ the formation at Cochrane is of Eocene age as represented by the Paskapoo beds, which include both the Porcupine Hills and the Willow Creek series of Dawson. It is therefore evident that *T. laramianum* and *T. distichum* belong to essentially the same horizons

¹ Rept. Geol. Surv., Can., 1886, 136 E.

² Trans. R.S.C., IX., iv., 36.

³ Amer. Nat., XXXVIII., 1904, p. 255 *et seq.*

⁴ Amer. Nat., XXXVIII., 1904, p. 267.

⁵ Rept. Geol. Surv., Can., 1886, 56 E. and 136 E.

and that they are therefore contemporaneous species, and any conclusions as to their relative sequence in development must rest entirely upon structural variations, which indicate that *T. distichum* is the more recent, as already shown.

CUPRESSOXYLON MACROCARPOIDES, n. sp.

Cretaceous, near Medicine Hat, Assiniboia, N.W.T.

Transverse.—Growth rings rather broad. Tracheids of the spring wood round but thin-walled through the obvious effects of decay; rather uniform in regular rows, and passing gradually into the rather thin but conspicuous summer wood. Resin passages wholly wanting. Resin cells not recognizable. Medullary rays prominent, often 2 cells wide, distant 1-6 rows of tracheids.

Radial.—Medullary rays wholly devoid of tracheids. Ray cells more or less conspicuously contracted at the ends, equal to about six spring tracheids; the upper and lower walls rather thin and sparingly pitted; the terminal walls chiefly straight, sometimes curved, not pitted or obviously thickened locally; the lateral walls with oval or round pits, 1-2, chiefly 2 per tracheid. Bordered pits in one row, chiefly distant, round. Pits on the tangential walls of the summer wood not recognizable. Resin cells present on the outer face of the summer wood (?), 30μ wide and 125μ long.

Tangential.—Fusiform rays wholly wanting. Ordinary rays numerous, low to high, often more or less 2-seriate, rarely 3-seriate in part; the cells variable, chiefly broad, oval or round or sometimes transversely oval. Resin cells rather numerous, usually very long, the resin scattering in small globules.

Of the two specimens representing this species, one has no assigned locality, but it is presumably from the same deposit as the other, with which it is structurally identical, and which was obtained from Twenty-mile Creek, near Medicine Hat. The structure has been so altered by decay and subsequent compression, that details respecting some of the most essential characters cannot be determined with certainty. There is nevertheless no reasonable ground for doubting the identity of the specimens with *Cupressus*, and among existing species they are most nearly related to *C. macrocarpa*. Indeed, the agreement is so close in nearly all respects that there is little reason for doubting that *C. macrocarpoides* is the ancestral form of the existing species, but in the absence of sufficient data to establish the identity beyond all question, I prefer to designate it by the name selected.

CUPRESSOXYLON DAWSONI, Penh.

Eocene of the Great Valley and Porcupine Creek series, Assiniboia, N.W.T. Cretaceous of the South Saskatchewan, near Medicine Hat, Assiniboia.

Bib:—Trans. R.S.C., IX., iv., 46; Dawson, B.N.A. Bound. Comm., 1875, App. A., 331; Knowlton, Cat. Cret. and Tert. Floras, 80.

This species is represented by eight specimens in all, all of which were derived from essentially the same locality, i.e., the Cretaceous formation of the South Saskatchewan, near Medicine Hat.

C. dawsoni was first recorded from the Eocene of the Great Valley and Porcupine Creek series last year, but the present material necessitates some modifications and amplifications of the original diagnosis, which may now be recast as follows:—

Transverse.—Growth rings variable, chiefly medium to broad. Tracheids of the spring wood large, thin-walled, conspicuously squarish, and passing gradually into the usually thin but rather prominent summer wood, which may occasionally become thicker and without definite internal demarcation. Resin passages wholly wanting. Resin cells numerous and conspicuous throughout the growth ring, often in more or less prominent tangential rows. Medullary rays prominent, resinous, 1 cell wide but rather broad, distant 2-9 rows of tracheids.

Radial.—Medullary rays devoid of tracheids. Ray cells resinous, contracted at the ends, equal to 5-6 spring tracheids; the upper and lower walls thin and sparingly pitted; the terminal walls straight, or sometimes strongly curved, not pitted or locally thickened; the lateral walls with round or oval pits, 1-2 per tracheid in vertical series, or in marginal cells and low rays, or over very broad tracheids, becoming 4 per tracheid. Bordered pits large, in one row, often more or less two-rowed. Resin cells numerous, 35-40 μ wide, 200 μ long.

Tangential.—Medullary rays of one kind only and uniseriate; the cells rarely in pairs, large, thin-walled, oval or oblong, usually broad and often becoming transversely oval in all except the terminal cells. Resin cells as in the radial section.

Nearly all the specimens included in the material now under consideration were indicated in the collection by a provisional label, bearing the name of *Salisburia*, but this genus has not been found to be represented by any of the specimens.

Cupressoxylon dawsoni has heretofore been known to one locality only, but its occurrence near Medicine Hat in what would seem to be great abundance indicates, in the first instance, a much wider geological range than was shown by the first described specimen from the Lignite

Tertiary. In the second place, it shows that the extension of the species into the Cretaceous is not to be interpreted as a factor of secondary value, but rather that it was, during that time, at its highest development, and that its occurrence in the Eocene represents a period of decline. This relation is also indicated with respect to the genus as a whole, though the data are not so pronounced as to permit of more than a provisional conclusion. Thus, for fifteen species of North American Cupressus, the geological age of which is definitely known, seven species are from the Tertiary, while nine are from the Cretaceous—one species being common to the two formations.

THUYA, sp.

Laramie series (Lignite Tertiary) of Assiniboia.

The material representing this genus is much too incomplete to admit of definite determination, though there can be no doubt as to its being the wood of a Thuya. It represents a remnant of the collections from the Laramie formation, made by the British North American Boundary Commission in 1874. No definite locality is given, but it is undoubtedly from the Lignite Tertiary, and probably from either the Porcupine Creek or Great Valley deposits. The diagnosis, as far as obtainable, is as follows:—

Transverse.—Growth rings rather broad. The summer wood very thin, of 3-6 rows of tracheids, rather open; the transition from the spring wood gradual. Spring tracheids large, round-hexagonal, rather uniform, in regular rows, the walls thickish. Resin passages wholly wanting. Resin cells numerous, large, resinous and scattering throughout the growth ring. Medullary rays rather numerous, narrow, distant 2-7 rows of tracheids.

Radial.—Structure of the rays too far obliterated to make the details available. Bordered pits not recognizable. Resin cells numerous, 40 μ wide, 298 μ long.

Tangential.—Rays numerous, narrow, uniseriate; the cells very uniform and equal, oblong, narrow.

Reference to the geological distribution of the genus Thuya shows that of ten species at present occurring within the limits of North America, eight belong to the Tertiary and only two to the Cretaceous, which seems to indicate very strongly that it is essentially a Tertiary type, and therefore of more recent date than Cupressus.

During the winter of 1902-3, Dr. F. H. Knowlton, of the United States National Museum, placed in my hands two specimens of wood, with the request that I should determine them and ascertain, if possible, the age of the horizon in which they were found. The first

specimen was beautifully preserved, and had all the external features of a fragment of wood from a recent tree, but which had been lying in water for some time. The grain of the wood could be distinguished, while the radial fractures not only displayed the medullary rays most clearly, but even the bordered pits could be seen as glistening elevations from the surfaces of the tracheids. From its lightness and porosity, it was assumed to be a specimen of *Sequoia*, a conclusion which upon subsequent examination, was found to be incorrect.

The specimen was received from Mr. C. M. Thorpe, of Bozeman, Montana, having been forwarded by him at the suggestion of Mr. V. K. Chestnut, who was engaged in the investigation of poisonous plants in that region. Mr. Thorpe's statement as to the location of the specimen is as follows:—

“This tree was found in excavating for a dam at Mystic lake near this city (Bozeman), and it was about eight feet down in the old lake bed deposit. This lake bed was deposited prior to deposits which have since been made by a glacier, I should judge, as portions of this old lake bed near where the tree was found had been covered with a glacial drift. The tree must be very old, as the lake bed has the appearance of having been deposited very slowly. The timber growing in that section of country at present is a scrubby growth of pine; the trees are about twelve inches and less in diameter. This tree is of a very different variety from anything which grows in that section of the country at present.”

Upon examination, the material was found to be absolutely free from infiltrated mineral matter, presenting, in fact, all the features of a recent wood which had been water-logged and subsequently dried. It softened readily in boiling water, showing the complete absence of silicification and sections were subsequently cut with the greatest of ease. The internal structure was then found to be most perfectly preserved in all its details, and it abundantly confirmed the impressions gained from an external inspection. No evidences of decay were present—indeed, the tissue was remarkably free from fungus mycelia, showing that the tree must have been covered up and hermetically sealed in its matrix very shortly, if not immediately, after falling. Were it not for the statement of Mr. Thorpe, that “the lake bed has the appearance of having been deposited very slowly,” I should infer, from the absence of decay, that the tree must have been carried down by an avalanche and immediately buried by the debris.

There was not the slightest difficulty in identifying the specimen with the existing Douglas fir—*Pseudotsuga douglasii*—approaching what is familiarly known as the “Yellow Fir” of fine grain. This

determination immediately raised certain questions which required solution:—

- 1st.—What deposits are represented by the Mystic lake beds, in which the tree was found?
- 2nd.—What is the relation of the specimen to the vegetation of the region at the present day, and especially to the distribution of the genus as now known?

The occurrence of *Pseudotsuga* in the fossil state is of exceptional interest, from the fact that the genus has been wholly unknown, especially through its wood, until 1901, when a specimen was brought to light from the Cariboo mine on the Horsefly river, British Columbia, representing the Miocene formation.¹ More recent studies have shown that wood of the same species also occurs in the Lignite Tertiary of the Great Valley and Porcupine Creek series of Assiniboia, thereby indicating that *P. miocena*, Penh., extends from the Eocene into the middle Tertiary, with a somewhat wide geographical range.² While it is at present difficult to establish the absolute identity of this latter species with the one now existing, there is a probability that the two are in reality the same, in which case it would be possible to show that *P. douglasii* ranged through the entire Tertiary formation, since the Bozeman specimen unquestionably represents later Tertiary without reference to its particular horizon; and from this it becomes evident that the existing species in all probability extends back to, and presumably into Cretaceous time, where its remains should be looked for.

With respect to the geological age of the Mystic lake beds, it is very difficult to draw any final conclusions from this isolated specimen, which might indicate a very recent deposit quite as well as one of Interglacial age, as suggested by the formation itself. But in this connection we are confronted with the fact that at such an altitude as that of Mystic lake there may have been local interglacial periods at varying intervals, which were not in any way correlated with the continental Interglacial period. A request for further information as to the geological age of the deposits elicited the statement from Mr. W. H. Weed, of the U.S. Geological Survey, that "the material in Mystic lake may be of any age, possibly much later than Interglacial." He thinks that glacial activity in that region may have (possibly did) continued until comparatively recently, and that it is risky to make the deposit fit into the standard time scale. "It must be as old as the Interglacial, though there is no evidence against its being relatively recent,

¹ Cret. & Tert. Plants of Canada, Trans. R.S.C., VIII., iv., 69.

² Tert. Plants, Trans. R.S.C., IX., iv., 47.

since glacial activity continued there so late." It is therefore impossible at present to determine the age of these deposits from geological evidence, but a consideration of the relation of the locality to the present distribution of *Pseudotsuga* may possibly offer some suggestion toward that end.

At the present time the genus *Pseudotsuga* is chiefly confined to the Pacific slope of the Sierra and Coast Range Mountains, the centre of distribution lying westward of the Sierras and ranging approximately from latitude 51° to 39° , thus including southern British Columbia, western Oregon and Washington, and northern California. But the species nevertheless spreads northward for a long distance, and eastward over the entire Rocky Mountain region into Montana, the limit being apparently defined by contact with the Prairie Region. In the vicinity of Bozeman, the species projects from the general eastern limit of distribution like a great spur, apparently following the foot-hills of the Big Belt Mountains, which terminate there. Bozeman lies about twelve miles to the westward of the southern terminal of the Big Belt Range in longitude $111^{\circ} 15' W.$, and latitude $45^{\circ} 41' N.$; and it is therefore well within the Rocky Mountain region, and about 100 miles to the west of the eastern limit which Prof. Sargent has assigned for the distribution of *Pseudotsuga*.¹ It would appear, however, from the statement of Mr. Thorpe, that "the timber of the locality consists of scrubby pine with a diameter of twelve inches, and that the fossil tree is unlike anything now growing in that section of country," that there must have been a local obliteration of the genus, possibly due to the same causes which led to its withdrawal from the Prairie Region at some time subsequent to the Eocene, since the occurrence of one species at least informs us that during the Lignite Tertiary age it must have been more or less abundant as far eastward as longitude $104^{\circ} W.$ Whether this recession from a formerly very wide distribution occurred at the close of the Eocene, in the Miocene or subsequently to the glacial period, we have no present means of ascertaining from our knowledge of the geological distribution of the genus. So far, then, as our knowledge of the genus itself goes, there is nothing which will in any way afford a clue to the particular age of the deposits at Mystic lake, and we may seek the aid of collateral evidence in the hope of securing further information.

The genus *Sequoia* at present centres in a region which is largely common to the centre of distribution for *Pseudotsuga*, though we have abundant evidence that during Cretaceous time the two genera were not only co-extensive on this continent, but that *Sequoia* itself was known to Greenland and Europe. It is therefore evident that there

¹ Tenth Census of the United States, Forestry Map.

has been a remarkable recession of the genus since Cretaceous time, a recession which has very nearly brought about its complete extinction. Looking at more recent geological periods, however, we find that in the Lignite Tertiary there were at least two species which ranged eastward as far as latitude 104° W., and they therefore occupied at least a portion of what is now the Prairie Region.¹ One of these, *S. langsdorffii*, is of very special interest in this connection because of its very generally recognized relation to *S. sempervirens*, of which it constitutes the ancestral form, if it is not wholly identical with it, since it was practically co-extensive with *Pseudotsuga* in the Eocene age. Still later, however this same species is found in the Miocene deposits of Oregon, British Columbia and the Valley of the Mackenzie river, in localities from which the tree was long since withdrawn. Finally, it has been pointed out by Sargent,² and more recently by Penhallow,³ that the genus *Sequoia* must have been driven into its present narrow limits of distribution at a period not later than the glacial, and probably by the very conditions which effected so marked an alteration of climate at that time. We are therefore led to see that *Sequoia* and *Pseudotsuga* were not only coextensive, but that their occurrence synchronized to so late a period as the Tertiary, and possibly even to the glacial epoch; and it is by no means an unwarranted assumption to conclude that the same causes which operated in the one case were also effective in the other, and brought about a sudden diminution of the geographical area; though, as is evident from the present range of the two species, these causes did not operate with equal force in each case, but rather tended more strongly toward the obliteration of *Sequoia*.

These conclusions then go far to show that the obliteration of the Douglas fir from the Bozeman region may have taken place simultaneously with the withdrawal from the Prairie region, which would make the age of the Mystic lake deposits not later than Interglacial. But such a conclusion can only be taken as a suggestion, since, as already shown, glaciation in all probability continued at that locality to a later period, and there is no evidence at hand to indicate that the genus was not obliterated by wholly local causes, and that the deposits in which it occurred were not similarly the result of local glaciation at a much later period than the continental Interglacial.

The second specimen of wood already referred to as having been transmitted to me by Dr. Knowlton was obtained by Mr. E. C. Eckel, of Dahlonga, Georgia, by whom it was forwarded to Dr. Knowlton.

¹ Tertiary Plants, Trans. R.S.C., IX., iv., 41-43.

² Silva of North America.

³ McGill Univ. Mag., vol. 2, pp. 121 & 122.

The data supplied to me by the latter, from the notes furnished by Mr. Eckel, show that the specimen was found during the summer of 1902 at Dahlonaga, Lumpkin County, Georgia, at 1,400¹ A.T. (U.S. Geol. Surv. Rec.), in a black clay, about twelve inches in thickness, overlain by a light gray clay which contained no plant remains.

Upon preliminary examination, the wood was found to be wholly free from impregnation by mineral matter, in which respect it resembled woods usually found in the Pleistocene deposits farther north. It was also obvious that it had been subjected to somewhat extended decay and subsequent collapse, assisted by pressure, in consequence of which much doubt was at first felt as to the possibility of satisfactory identification. Sections were nevertheless made with all due precautions, and a careful examination disclosed the fact that, while the bulk of the structure had been subjected to extreme alteration through decay and compression there were nevertheless local regions which had escaped those influences to a large extent, and embraced recognizable structural details. By very careful study of an extended series of sections, it became possible to gather sufficient evidence to identify the specimen beyond all reasonable doubt, as representing the common American larch or tamarack, *Larix americana*. The occurrence of this tree in such an unusual locality at once directed attention to the possible circumstances under which it could have reached such an extreme southern limit of distribution. The present geographical range of *Larix americana* places its southern extension in northern Pennsylvania, yet the specimen under consideration was found nearly five hundred miles farther south.

With respect to the nature of the deposits in which the specimen was found, my request for further information respecting their geological age elicited the statement that "there appears to be no means at hand for definitely correlating the deposit with any generally recognized physical events of the coastal plain," though the suggestion was made that a tentative reference to the Lafayette or Columbian formations, preferably the former on account of its altitude, might lead to conclusions of value.

Referring to the records of the State Geological Survey,¹ I find that Dr. J. W. Spencer describes the deposits of the Lafayette and Columbian series as composed of "deposits of orange or red sandy clays or loams, massive and laminated sands, with local gravel deposits, and occasional lighter coloured clays," which spread out as mantles over the whole of southwestern Georgia. The range of altitude throughout which these accumulations extend reaches from elevations of eight

¹ Geol. Surv. Georg., 1890-91, p. 61 *et seq.*

hundred feet above the sea, down to, and occupying the lowest valleys at less than one hundred feet.

In dealing with the possible age of these deposits, Dr. Spencer makes no distinction between the Lafayette and the Columbian, thereby dissenting from the opinion of Mr. W. J. McGee, which he quotes to the effect that the Lafayette belongs to the Pliocene or later Miocene, while the Columbian is Pleistocene, though he agrees with Mr. McGee that the Pleistocene period commenced earlier in the south than in the north, leaving its records in the Lafayette deposits.¹

A more recent discussion of these formations by Mr. R. Ries² nevertheless adopts the views of Mr. McGee, placing the Lafayette in the late Miocene (Neocene) and the Columbian in the Pleistocene. Further careful inquiry has established the fact that there is practically no available knowledge which may be utilized in determining the age of the deposits in question, and it therefore becomes of the greatest importance to ascertain what conclusions may be derived from the occurrence of the common tamarack at such an unusual place.

The occurrence of *Larix americana* in the Dahlenega clays at a point so far distant from its present southern limit at once suggests that the deposits are of Pleistocene age. That they are not of more recent origin would seem to be supported by the complete absence of *Larix* from the same region at the present time; whilst it would seem improbable that they are older, because we as yet have no knowledge of the wood of this tree in deposits of greater age than the Interglacial. Within Pleistocene time, *Larix americana* is one of the most abundant and characteristic types within a wide geographical range, extending from Montreal through the region of the Great Lakes westward to the Moose River in Canada, and to Fort Madison in Iowa.³ It has also been found in peat bogs in New Brunswick, but as such deposits are in all probability of very recent origin, they possess no significance for our present purpose.

Somewhat extended investigations of the Pleistocene deposits in the Don Valley at Toronto have already given us somewhat detailed

¹ Since the above was written, Mr. W. S. Yeates, Director of the Geological Survey of Georgia, has kindly directed my attention to a reference in his report upon the Gold Deposits of Georgia (Bull. No. 4, A., pp. 293 and 395) to the formation in which the wood was found, from which it appears that Dr. Knowlton (1896) had already referred it to the Pleistocene, while Dr. Becker referred it more specifically to the Columbia formation. It would therefore appear that the same conclusion has been reached from two distinct and independent points of view.

² Maryland Geol. Surv., 1902, p. 379.

³ Jn'l. Geol. III., 626: Bull. Geol. Soc. Amer., I., 326, 334: Pleist. Flora of Can., B.A.A.S., 1898 & 1900.

knowledge of the succession of the floras attendant upon movements of the ice sheet, and it is in this connection that the present specimen acquires additional interest. The Toronto deposits show three well defined phases in the migration of plants during glacial times. In the first period the vegetation of the entire region was of a much more southern type than that which now flourishes in the same region. It was, in fact, such as now characterizes the Middle United States, embracing such types as *Asimina triloba* and *Maclura aurantiaca*. As the ice sheet subsequently moved southward it drove before it all these mild climate forms, and brought about the introduction of more boreal forms, in which the northern poplars and spruces and a variety of mosses were especially prominent, so that the vegetation as a whole was like that of northern Quebec and Labrador as we know it to-day. Finally the ice sheet once more retreated to the position it now occupies, and in so doing it favoured a northward migration of the vegetation, which was once more restored to a condition about midway between that of the first and second periods, thus giving the flora which has continued to the present day.

One of the best evidences of the extent to which this northward migration developed is to be found in the re-establishment of the common papaw or *Asimina triloba* along the shores of Lake Ontario. During the first or Don period, characterized by a warm climate, this shrub was a somewhat common element of the flora. In the second or Scarborough period, characterized by a cold climate, it seems to have disappeared completely, and we as yet have no record of its occurrence in the third or Green's Creek period, characterized by a mild climate, though it does now occur somewhat sparingly in the same region where it reaches its highest northern limit of distribution. From the shores of Lake Ontario the papaw ranges southward through New York and far beyond, with a continuity which does not afford any means of determining the actual extent of the migration.

Directing our attention to the osage orange—*Maclura aurantiaca*—it is possible to gain somewhat more definite information as to the range of such migrations. This shrub was a well-defined element of the Toronto flora in the Don period, and it therefore flourished abundantly in latitude 43° 15' N. Taking the present northern limit of distribution as defined by the northern limit of Kansas, in latitude 40° N., there is an actual interval of about 224 miles between such northern extension as represented in Pleistocene time and now. This, then, gives an approximate measure of the extent of the migrations attendant upon movements of the ice sheet, but only approximately, because there is some reason for the belief that the range of the osage orange may

have extended far beyond Toronto during the Don period.

We are now brought more particularly to consider the evidence afforded by *Larix* itself. If we accept the present southern limit of *L. americana* as lying within northern Pennsylvania, it would be located in about $41^{\circ} 30' N$. Assuming that the extreme southern extension of the species in Pleistocene time is correctly represented in the Dahlonge clays, then it must have been pushed southward to latitude $34^{\circ} 30'$, and this position must have been reached during what is known as the Scarborough period. Since the Scarborough period the vegetation has retreated northward to such an extent as to establish the present southern limit of the species, involving a migration of about 480 miles. But we find that the extreme southern limits of the terminal moraines in Illinois are only about 300 miles from Dahlonge, whence it may be inferred that *Larix* may have been pushed at least one hundred or one hundred and eighty miles farther to the south, where its remains should be looked for. It has already been pointed out that the osage orange affords evidence suggestive of the idea that during the Don period its highest northern limits may have been at least two hundred miles north of Toronto, and it therefore becomes obvious that between the Don period on the one hand and the Scarborough period on the other, the movements of the ice sheet must have induced a migration of individual species to the extent of about eight hundred miles.

With respect to the more immediate question involved in our study of the Dahlonge specimen of *Larix*, the facts thus far recited seem to amply justify the conclusion that the clays in which it was found are chronologically equivalent to the Pleistocene deposits of the north, having been laid down during the Scarborough period.

Early in February of the present year I received from Prof. Ralph S. Tarr, of Cornell University, eight specimens of plant remains obtained from a series of borings which were made at Ithaca, N.Y., for the purpose of securing artesian wells. Unfortunately the majority of the specimens were worthless for purposes of determination, on account of their exceedingly fragmentary character, and it was therefore necessary to concentrate attention upon only three of them. One proved to be a small putamen of some drupaceous fruit; one represented the wood of the larch—*Larix americana*—and the third represented a pine, apparently *Pinus rigida*. Prof. Tarr reports that there was an unusual abundance of logs within the range of the borings, and it is to be regretted that circumstances were not favourable to the collection of a large number of workable specimens. The formation in which the trees were found is of Pleistocene age, with a total thickness of 342 feet.¹ The trees, however, occur only in the upper strata, the larch

¹ Artesian Well Sections at Ithaca, N.Y. Jn'l of Geol. XII., 1904, 69-82.

occurring at a depth of fifty feet, while the pine was found at a depth of thirty to thirty-five feet. While the occurrence of *Larix americana* is a well-known feature of Pleistocene deposits, this is the first occasion on which *Pinus rigida* has been recorded, and the fact that only one other species—*P. strobus*—has hitherto been found very sparingly in the Toronto beds of the Don period would seem to suggest that the genus as a whole was very scarce in Pleistocene times, or that the two localities so far recorded do not lie within the range of most abundant distribution.

On the first of April, Dr. F. H. Knowlton, of the U.S. Geological Survey, transmitted to me a number of specimens of wood—seven in all—for the purpose of identification. They were presented in two sets, the first of which was taken from the Rough and Ready Mine, two miles down the Klamath river at Orleans, Humboldt Co., California. The deposits in which they occurred consisted of blue, sandy silt, at least 265 feet above the river, and buried under at least 150 feet of local slate debris. Of the three specimens embraced in this set, all were determinable without difficulty, and could be referred to existing species. Two of them proved to be *Juniperus californica* and one to be *Pseudotsuga macrocarpa*.

The second set, consisting of four specimens, was obtained from the Ferris Mine, directly opposite Orleans. The specimens were deposited in a dark-blue, slaty muck at 150 feet above the Klamath river, and buried under 50-60 feet of local debris. Owing to the state of preservation, it was not possible to determine all the material satisfactorily, but one proved to be *Juniperus californica*; one was probably a *Pseudotsuga*, and therefore *P. macrocarpa*; one was either a *Pseudotsuga*, *Larix* or *Picea*, presumably the first, while one was wholly undeterminable.

An examination of the specimens revealed some peculiar conditions of preservation, which have not been presented by any of the numerous fragments of wood passing through my hands, except in one instance. The specimens were but slightly silicified in all but one case, though all yielded to the action of hot sodium carbonate, after which treatment they were readily cut on the microtome. One specimen from the Ferris Mine had been altered by decay to an extreme extent before silicification, so much so that it was carbonized throughout and so friable that sections could not be cut. It was therefore undeterminable. With this exception, all the specimens showed that, in addition to comparatively slight alterations effected by the operation of fungi, the cell walls were strongly swollen throughout, and to such an extent as to more or less completely obliterate the central cavity, thus introducing a modification

which at first sight involved an element of difficulty in diagnosis. The swelling of the secondary walls thus observed is precisely of the nature of that which we are familiar with as resulting from the prolonged action of an alkali, especially when aided by heat, and it seems to give very clear proof that the woods must have been immersed in the water of hot springs containing a small proportion of alkaline silicates, with a large proportion of free alkali. From this we are enabled to determine that the general sequence of events in the process of petrification must have been:—

1. The operation of somewhat limited decay.
2. The action of hot alkaline solutions on the tissues.
3. The action of alkaline silicates.

The only other instance of similar alteration which we have met with was observed in the case of *Taxodium distichum* from the Lignite Tertiary of the Great Valley Group in the Northwest Territories. In that case, however, the subsequent silicification had been carried much farther, so that the whole structure was converted into a mass of silica, which could only be cut on the lapidary's wheel.

Mr. Oscar H. Healy, from whom the specimens were obtained in the first instance, states that the formation is "Late Quaternary," and that it dates from a period of excessive humidity, apparently closing the "Intermediate Stage" of glaciation, probably about "Iowan" in age.

The *Pseudotsuga* of these deposits is well within the present range of the species which extends along the coast ranges into southern California, and it is, in fact, within the region of greatest development of that genus.

Juniperus californica, on the other hand, indicates that the species has receded from its former range. At the present time it is unknown in Humboldt county. According to Prof. Sargent, its greatest northern extension is to be found in the valley of the Sacramento, whence it ranges southward along the coast ranges. It is therefore at the present time a somewhat more southern type than formerly, and we are therefore led to infer that the climate of Humboldt county was originally somewhat warmer than at present. This would agree with our knowledge of the recession of *Pseudotsuga* and *Sequoia* within late Tertiary time, and would seem to point to the operation of the same general causes.

Recent explorations of the Interglacial beds at Toronto have brought to light an additional amount of material, which, while it does

not add materially to the number of previously recorded species, nevertheless furnishes further information of value as to the abundance of certain species. As transmitted to me by Prof. A. P. Coleman in the latter part of April, the species are comprised in two lots. The first was obtained from the Don Valley Brickyard, and includes five good specimens of wood, and a large number of fragments of leaves, representative of ten different species. The second lot was derived from Logan's Brickyard, and embraces twelve specimens of wood representative of two genera.

Don Valley Brickyard.

Acer pleistocenicum, Penh.

This species has been found on only two occasions heretofore, the first being in 1890, when the original description was made,¹ and the second in 1898, when a specimen was obtained by Prof. A. P. Coleman from Taylor's Brickyard.² There has therefore been reason to regard it as a species which was not abundantly represented in the flora of the Don period, and that it may have been at the limit of its existence at that time. In the material recently received, however, it is represented by no less than thirty-three out of sixty-five recognizable specimens, or to the extent of 50.7% of the whole. From this it is evidently necessary to modify any previous expression of opinion, since it is obvious that the tree must have constituted a prominent element of the flora.

Since our last enumeration of the Interglacial plants of the Don Valley, attention has been directed to a maple from the Tertiary of Randolph County, Wyoming, which Lesquereux described under the name of *A. indivisum*,³ but which, owing to the preoccupation of this name by O. Weber, Knowlton, has rechristened *A. lesquereuxii*. This leaf is described as thin and small, and five lobed, but an inspection of the figure leads us to the belief that the apparently five lobed form is in reality due to breakage and obliteration of certain of the veins through decay. If this supposition be correct, then the leaf is really seven lobed, and this would explain certain otherwise unaccountable features of the figure. Assuming this to have been the case, then *A. lesquereuxii* and *A. pleistocenicum* cannot well be separated from one another, since Lesquereux's original diagnosis of "lobes entire, sharply acuminate; sinuses broad, entire or dentate in the middle" are as ap-

¹ Bull. Geol. Soc. Amer., I, 327, 1890.

² Rept. B.A.A.S., Bristol, 1898, 527.

3. U.S. Geol. Surv. of the Terr., Cret. & Tert. Flor., VIII, 180, 1883.

plicable to the one as the other, and the only real difference is in point of size. It therefore seems probable that *A. pleistocenicum* is much older than we formerly had reason to suppose, and that it has already been described by Lesquereux, but in the absence of sufficiently complete material of *A. lesquereuxii* with which to make comparison, a final decision on this point must be reserved.

Carya alba, Nutt.

This species is not abundantly represented, being exhibited by one terminal and one lateral leaflet only, and it therefore constitutes only 3% of all the material. It has, nevertheless, been noted on two former occasions as occurring in at least four different localities within the limits of the Don deposits. It is a characteristic element in the flora of the Don period, of which, however, it does not seem to have formed a very prominent feature.

Clethra alnifolia, Gronov.

Only one specimen of a leaf of this plant appears in the present collection, of which it forms only 1.54%. This is a first record for this plant in the Pleistocene flora. It is at present unknown in the vicinity of Toronto, being essentially a coast plant, but its northern extension on the coast of Maine places it in essentially the same latitude. Its occurrence in the Pleistocene of Toronto is readily consistent with its present habitat, when we recall the former extension of the Pleistocene sea into the region of Lake Ontario. Finally, its occurrence in the flora of the Don is in no way inconsistent with the general character of the associated types.

Hippuris vulgaris, L.

One specimen only, representing 1.54% of the entire material. The fragment shows a stem 2.5 cm. long and 1 mm. wide, bearing two whorls of leaves, with five to seven leaves in each whorl. The leaves are 8-9 mm. long, and not very well preserved, though the entire specimen shows well-defined characteristics of the plant. This is the first record for this species in the Pleistocene deposits.

Juniperus, sp.

Specimens designated as 4 and 5 from the Don Valley Brickyard were found to be coniferous wood in a highly altered condition through the action of decay and subsequent compression. Beyond the presence

of numerous resin cells, it was found impossible to carry the determination further than to ascertain that the wood is probably that of *Juniperus*, in which case it would in all probability be that of *J. virginiana*.

Picea nigra, Link.

Specimens 2 and 3 from the Don. Valley Brickyard were found to be devoid of silicification, but much altered by the effects of extreme decay. They clearly represent the wood of *Picea*, and in all probability of *P. nigra*.

Populus balsamifera, L.

Two specimens of leaves represent this species, which has hitherto been found somewhat abundantly in the deposits of both the Don period and the Green's Creek period.

Quercus alba, L.

A specimen of wood marked No. 1, from the Don. Valley Brickyard, was characterized by its hardness, due in part to silicification. The specimen yielded to the action of hot sodium carbonate, and proved to be a species of *Quercus* much altered by extreme decay and compression, in consequence of which it was impossible to determine the species which may be any one of seven previously noted from the same deposits. On account of the associated leaves and certain structural features, it may be provisionally assigned to *Q. alba*. From the same deposits a large number of leaves were obtained. These amounted to eleven specimens in all, or 16.9% of the entire collection, and could be referred to the same species without difficulty.

Quercus macrocarpa, Michx.

Mingled with the former were several characteristic leaf fragments of the Bur Oak, which have similarly been found in previous collections from the Pleistocene of the Don period.

Quercus tinctoria, Bart.

This tree, also common to the deposits of the Don period, was represented in the present instance by a few fragments only.

Tilia americana, L.

The common basswood is represented by two fragments of leaves only, but it is a well-known constituent of the Don flora.

Ulmus americana, L.

The American elm is represented in the present instance by a few fragments only, but it has been recognized frequently on former occasions, and no doubt formed a prominent feature of the Don flora.

Logan's Brickyard.

All of the specimens from Logan's Brickyard were represented by fragments of wood, the majority of which were in an excellent state of preservation without silicification, and permitted of determination without difficulty, except in one case where decay had operated extensively. All the specimens gave evidence of prolonged immersion in water, and a few were very strongly macerated. Only two genera and two species were found, as follows:—

Larix americana, Michx.

The common larch was represented by four specimens, or 33.3% of the entire collection. In most cases the structure was well preserved, a feature commonly observed in *Larix* when associated genera may be greatly altered, and in one instance the long, thin splinter of wood showed the effect of fire, indicating the result of a forest fire. The occurrence of this species indicates nothing of special note, since it is a well-known element of the Pleistocene flora of both the Don and Scarborough periods, and its excessive range in latitude does not afford any special index of climatic conditions.

Picea nigra, Link.

The bulk of the material from Logan's Brickyard consisted of fragments of branches of the common black spruce, which could be identified without difficulty, although in one case with an element of doubt, on account of the advanced condition of decay which it presented. The great abundance of this species, amounting to 66.6% of

the entire collection, seems to point to the local abundance of the tree. Like the larch, it is a well-known element of the Don flora, while its somewhat extended range in latitude does not permit us to draw final conclusions as to climatic conditions, except as it is associated with other types of more pronounced adaptation.

Reference to previous summaries ¹ will show that the majority of the plants represented in the present collection are characteristic of the warmer climate of the Don period, while only one—*Larix americana*—is also characteristic of the Scarborough period, and one—*Vallisneria spiralis*—is exclusively known through former collections to the mild climate of the Green's Creek period. Of the two new representatives of the flora, both are quite compatible with a mild or even warm climate, and therefore offer no evidence in opposition to previous conclusions respecting the climate of the Don period.

¹ Rept. B.A.A.S., Bradford, 1900, Pleist. Flora & Fauna, p. 1.

IV.—*New Species and a new Genus of Batrachian Footprints of the Carboniferous System in Eastern Canada.*

By G. F. MATTHEW, D.Sc., LL.D.

(Read June 23, 1904.)

Last year the author of this article described in the Canadian Record of Science, Montreal, a number of new genera of Palæozoic footprints based on material from the Coal-Measures and Lower Carboniferous preserved in the museums of McGill University, Montreal, and that of the Geological Survey at Ottawa. Types for these genera were figured and cited, and this article is written to describe these types more fully, and also to describe and figure other species of these genera.

PSEUDOBRADYPUS.¹

This remarkable form was described by Sir Wm. Dawson under the name of *Sauropus unguifer*. He directs attention to the great claw on the fifth digit, of the hind foot, but seemingly did not notice that the claws on the other toes were also long. From the way these claws are tangled and crossed one might surmise that the creature did not habitually live on the ground, and that the foot was not adapted for such use. The hind foot, which is the one usually observed had a long sole and a prominent heel. The heel was not elongate longitudinally, but transversely; there was also a very decided instep or hollow in the sole in front of the heel. The hind foot in this animal was a powerful member for grasping, and would seem to have been adapted like that of the sloth for climbing in trees.

In walking this animal left a heavy tread which perhaps was partly caused by the weight being thrown on the hind feet, as it is only at intervals the print of the fore foot is seen. Notwithstanding the clumsy outfit for walking the animal appears to have moved rapidly, as the stride is twice as long as the space between the two rows of footmarks. The long interval between the footsteps also indicates legs of some length.

Sir William Dawson's description states that there were five toes to the hind foot, and four to the fore foot, with a doubtful fifth toe.

The figure of this species, which is a rough presentation of its form, will be found in Geol. Magazine, London, Series 1, vol. ix. p. 251-253.

The generic name is in allusion to remarkable grasping power possessed by the foot in which it resembled the sloths.

¹ Can. Rec. Sci., Vol. IX., No. 2, p. 109.

Note on Footprints from the Carboniferous of Nova Scotia, in the collection of the Geological Survey of Canada, by J. W. Dawson, LL.D., F.R.S.¹

“SAUROPLUS UNGUIFER.”

“The principal specimens are several large slabs of brownish sandstone, bearing series of footprints in relief. Of the largest and most distinct series, 40 to 50 footprints have been preserved, and are arranged in two rows 5 1-2 inches apart. I may confine my attention in the first place to this series, as the most important of the whole.

They were probably produced by a large Labyrinthodont Batrachian, walking on a muddy shore, near the edge of the water, and are not very dissimilar from those described by Sir C. Lyall as found by Dr. King in the Carboniferous of Pennsylvania. They also closely resemble in size and form, the footprints found by Mr. R. Brown, F.R.S., in the coal field of Sydney, Cape Breton, and described by me in the second edition of “Acadian Geology,” p. 358, under the name *Sauropus Sydnensis*, and still more closely those found by Mr. J. M. Jones, F.L.S., at Parrsboro, N.S., and noticed in the same work. With these they may in the meantime be included in the provisional genus *Sauropus*.

The dimensions of the footprints are as follows:

Hind foot, breadth	2.71 inches
Hind foot, length	4.24 “
Fore foot, breadth	2.63 “
Fore foot, length	2.77 “
Length of stride	11.53 “
Average distance between the rows of footprints made by right and left foot	5.48 “

These measurements correspond very nearly to those of my *Sauropus Sydnensis* above referred to.

The hind foot, it will be observed, is considerably larger than the fore foot, and has a sort of plantigrade appearance, and there are some indications which show that the legs must have been strong and thick.

The hind foot shows four well developed toes, the three outer stronger than the remaining one. There was also a fifth toe which must have been placed at a higher level than the others, on the outside of the foot. It bore a long claw, which was plunged into the mud at

¹ Geol. Mag. London, Vol. IX., 1872, p. 251.

each step, and when the foot was raised, made a curved trace on the surface. It probably corresponded to the thumb-like fifth toe of the Labyrinthodonts, and to the detached outer toe of the footprint figured by Sir C. Lyall.

The fore foot is as broad as the hind foot, but much shorter, and shows four strongly marked toes with more obscure impressions of a fifth.

All the toes of both feet are broad in front, and seem to have had claws, but not of great length, except in the case of the detached toe of the hind foot, above referred to. There is no indication of a membrane connecting the toes.

The prints of the hind and fore foot of each side are in line, and the distance between the right and left lines, say $5\frac{1}{2}$ inches, indicates a broad body in comparison with the length of the legs.

The impression of the hind foot is either a little way behind that of the fore foot, or the impressions are equidistant, indicating a walking gait, varying somewhat in the length of stride.

There are no indications of a tail, and in general the body was carried clear of the ground, but in one place it has been dragged along the surface, leaving longitudinal furrows, probably indicating that the abdomen was clothed with bony scales, as was generally the case in the Labyrinthodonts of the Carboniferous. On another slab there seems to have been a soft place where the legs of the animal have sunk deeply in the mud, and it would appear to have mired, extracting itself with some difficulty, and leaving deep marks of the body and legs.

These footprints must have been on a subærial surface, probably left dry by the recession of the tide, and rain must have fallen shortly before the animal passed over it, as indicated by the pitted appearance of the slabs. The trunk of the creature may have been three feet in length. Its tail, if it had any such appendage, must have been short, or carried in the air without touching the ground. Its legs were strong and bore the body well above the surface when walking. The only known Carboniferous Batrachian of Nova Scotia which could have made these impressions is *Baphetes planiceps*, Owen, discovered by the author in the coal-field of Pictou.

The principal distinctive character of the present specimens, is the peculiar appendage of the hind foot, and from this we may give the provisional name *Sauropus unguifer* to those footprints, until the animal which produced them shall be known to us by its bones.

One of the slabs in the rooms of the Survey show a number of less distinct footprints of an animal which may have been two-thirds of the size of that above described, though possibly of the same species.

On another slab, and associated with the larger footprints, are some small trifold impressions which seem to indicate the presence of a still smaller animal, with feet of different form from those of the others. Those small trifold footprints are not dissimilar from those found by Sir W. E. Logan at Horton, in 1841, and which were the first indication of reptilian life discovered in the Carboniferous.

In addition to the slabs above referred to, there is another in the possession of S. Fleming, Esq., C. E., in Ottawa, of which I have seen a photograph, which is reproduced in the accompanying wood cut. It contains a good series of *Sauropus unguifer*, above described, and shows best the equidistant character of some of the impressions."

The following observations were made by the author on the type specimens preserved in the Museum of the Geological Survey at Ottawa, and show some additional particulars.

Stride, 13 inches; Straddle, $10\frac{1}{2}$ inches.

Print of the fore foot not usually present.

Hind foot. Length, 10 inches or more (length to the heel, 8 inches), width, $5\frac{1}{2}$ inches. The fifth digit has a long curved claw. The fourth has a still longer curved claw. These two claws set off on the outside of the print of the foot, with the claws curving inward; that on the fourth is especially long and curved, and its point was held habitually below the claws of the succeeding digit. The third digit is long and straight, directed somewhat outward, and bears a claw. The second toe is heavy, and bears a claw directed somewhat inward; it appears to have a branch phalange directed parallel to the third (but this apparent branching may be due to an independent movement of this toe. The first toe is heavy, especially near the sole, and is directed somewhat inward. The third, fourth and fifth digits have a knuckle at the base of the claws. The sole is heavy and rounded, and between it and the heel of the palm is an instep or depression; this depression separates a ridge or heel, which is transverse to the axis of the footprint.

Fore foot. This series does not show the print of the fore foot. Another has the fore foot which is broad and round. There are five digits, the fifth but slightly spread. The fourth, third and second directed forward and somewhat outward. The first digit is directed broadly inward. The claw on the fifth went forward, but in the fourth inward, on the third turned outward, crossing the three above it. The second claw turned outward towards the third. The sole of the fore foot was heavy, round and heavily impressed.

In some parts of this series of footprints the impressions were faint. Most tracks do not show the attitude of the claws, which may have been variable.

HYLOPUS [??] MINOR Dawson.¹

The following is Sir Wm. Dawson's description of this species:

"On a slab of sandstone in the Museum of the Geological Survey, at Ottawa, collected by Mr. Weston is a series of small footprints about 2 cm. in diameter, with five toes, the fore foot being a little smaller than the hind. The length of the stride of the hind foot is eight cm. The distance transversely from the outside of the track is about six cm. There is a central tail-mark, and at the sides, where the animal has turned, it has left a few slight striae probably representing the ends of the lateral lappets. These tracks are probably those of a microsaurian. I have some small slabs with similar, but less perfect, impressions collected by Mr. Devine at the Joggins a few years ago."

The following notes on this species as shown on the type slab preserved in museum referred to, were made a year ago.

There are impressions of both the hind and fore feet.

Hind foot. This has five toes. The fifth digit is short and somewhat obscure, and is turned somewhat backward. The fourth and third digits are long and turned outward; also the nail-marks turn outward. The second and first digits are progressively shorter; they point forward. There are claws on the second, third and fourth digits. The sole is long owing to the fifth digit being set far back.

Fore foot. This has five toes, pointed. The fourth digit is longest, the others are progressively shorter inward. They are spreading and the sole is short.

A median ridge is distinct on the forepart of the series of the foot-marks, but flattened and obscure at the other end of the track. The toes seem to have been flexible as some of the markings are curved. The prolonged sole causes this hind foot to resemble that of *Pseudobradypus unguifer*, but it had not the great claws of that species.

No phalanges could be identified on any of these tracks. The turning out of the toes of the hind foot and the turning in of those of the fore is marked and would have given firmness to the tread.

On approaching the ripple marks on the upper part of the slab on which these tracks are preserved, the step is shortened and the foot-prints fade out, while the median groove is still traceable.

Separate from this track, but on the same slab, are tracks of one or two other species of saurians. Between two of these is a curving set of four parallel striae made by the claws of some animal.

These footprints are preserved on a slab of gray sandstone from the Joggins, Nova Scotian Coal Measures.

¹ Trans. Roy. Soc. Can., Vol. XII., (4) p. 78.

Sec. IV., 1904. 6.

Without a more careful examination and comparison of these footmarks the writer is not prepared to make a generic reference; though if *Hylopus* is limited as in the following pages, this species must go elsewhere as having five toes on each foot and a large sole to the hind footmark.

HYLOPUS, Dawson.

Pl. I, fig. 1*a*, *b*. Pl. VI, figs. 1 and 2.

Sir Wm. J. Dawson describes the several footprints of quadrupeds of the Carboniferous age obtained from the Joggins, Parrsboro, Horton and Sydney, Nova Scotia, under the two genera, *Sauropus* and *Hylopus*.

The latter genus being Dawson's own, it behooves us to examine the types and learn what its characters are. He defined the genus *Hylopus* as follows: "Smaller footprints [than *Sauropus*, Lea] Digitigrade, and made by animals having a long stride, and hind and fore feet nearly equal. Five toes. Probably footprints of *Microsauria*, and possibly of *Dendrepeton*."¹

This genus was based upon three species described in Sir William's "Air-breathers of the Coal Period,"² and figured in the same essay, but not then named; in the later essay they have names given them, and an additional species is described. There is so much variation in the form of these footprints that they cannot all be contained in the genus *Hylopus*, and it becomes necessary to select a type or types to represent the genus. There are two forms which appear to come nearer the ideal of Dawson's genus than the others, these are *H. Logani* and *H. Hardingi*.

It would appear from the figures given in the "Air-breathers" that both of these species were described from casts, one of which, *H. Logani*, is in the Redpath Museum, Montreal, the other, *H. Hardingi*, in that of King's College, Windsor, N.S. Both species are of Lower Carboniferous age, and come from measures underlying the Carboniferous limestone. The author has been favoured with an opportunity to examine both of these casts, and so has seen the objects on which Sir William has based the genus *Hylopus*.

The series of footmarks which are the type of *H. Logani*, are supposed by Sir William to have been made in soft mud by an animal partly water-borne, and they are decidedly "digitigrade," in some cases only the long middle toes scrape the surface of the mud, and were not impressed upon it, and in the most distinct only the toe marks are preserved, hence the track is truly digitigrade. But this is not the case with any of the

¹ Trans. Roy. Soc. Canada, Vol. XXII., Sec. IV., p. 77, 1894.

² Air-breathers of the Coal Period of Nova Scotia, Montreal, 1863

other species; all of them have the print of the sole of the foot preserved.

The imperfection and irregularity of the track in *H. Logani*, which by Sir Wm. Dawson himself is said probably to be that of an animal partly water-borne, prevents one from using this as the type of the genus; we therefore fall back on the second species as the one which can be taken as a generic type. This species is *H. Hardingi*.

The first reference we have to this fossil is in Lyall's *Elements of Geology* (New York, 1866, p. 510), where the author says: "Footprints of two reptiles of different sizes had previously been observed by Dr. Harding and Dr. Gesner on ripple-marked slabs of the lower coal-measures in Nova Scotia, evidently made by quadrupeds walking on the ancient beach, or out of the water, just as the recent *Menopoma* is sometimes observed to do."

The footprints are again referred to in Dawson's *Acadian Geology* (London, 1868, p. 356, with figures). Here Sir William says (p. 356) that "Dr. Harding, of Windsor, when examining a cargo of sandstone from Parrshoro, N.S., found on one of the slabs a very distinct series of footprints, each with four toes, and a trace of a fifth. Dr. Harding's specimen is now in the museum of King's College, Windsor. Its impressions are more distinct, but not very different otherwise from those found at Horton Bluff" [*H. Logani*.]

According to "Air-breathers," (p. 9, Explanation of Plates, Fig. 2), the figure of *Hylopus Hardingi* is from a rubbing taken by Professor How, of Windsor College, and was evidently taken from the cast of the fossil. Prof. How apparently failed to perceive and to indicate the impression of the sole, or "heel," and so the drawing appears to be taken from a digitate print, whereas the imprint shows plainly that the animal rested on the sole of the foot as well as on the toes, in walking. There is therefore no species of *Hylopus* in which the impression of the sole is entirely wanting, except that of *H. Logani*, whose peculiar impressions we have noted above.

There is a marked advantage in the regularity as well as in the distinctness of the tracks of *H. Hardingi* to the observer who wishes to learn what the characteristics of the genus *Hylopus* are, for they show distinctly the sole of the foot, and so approach a type of footmark common in the Carboniferous system. *Hylopus*, therefore, was made by an animal which did not walk on the toes alone, but also pressed the sole of the foot to the ground.

Hylopus (as represented in the species *H. Hardingi*) clearly had five toes to the hind foot, but the fifth toe of the fore foot is mistakenly shown. In his "Air-breathers," Sir William Dawson says (p. 7): "One pair of feet [the hind feet?] appears to have had four claws; the other pair may have had three or four." So that the number of toe

prints is variable, but *H. Hardingi* better represents the type of the genus than *H. Logani*.

Sir William's description of *H. Hardingi* is as follows ("Air-breathers," p. 8): "Dr. Harding found on one of these slabs a very distinct series of footprints, each with four toes and a trace of the fifth."

As the stride in *H. Hardingi* was five and a half inches, the track was probably that of an animal more than twice this length, *i. e.*, more than a foot long. The width of the track was two and a half inches.

In this species the print of the inner pair of toes was faint, indeed as regards the fore foot there was not any print of the first digit. There were, especially as regards the fore foot, three master toes, which always made a strong impression; in the hind foot this preponderance of the three central digits is not so marked, but still it is observable. The absorption, or weakening of the side toes, was thus in progress in these early forms. This process, if continued mainly in the fore foot, would in time give a species which would have the characters of *Asperipes*, in which the fore foot shows only three toe marks, but the hind retains five, and a form of footprint, not unlike that of the hind foot of *Hylopus Hardingi*.

The tendency to this absence of the print of the outer toes is seen in the more advanced footmarks in the typical series of footprints of *H. Hardingi*, where only three toe marks can be observed in the print of the fore foot.

In examining the track of this animal in detail, it will be seen that the creature had the habit of placing the hind foot directly behind the fore foot in walking, so that the two prints made by these feet were just clear of each other. An exception is seen in the first track of the series where the print of the hind foot overlaps that of the fore foot; and a partial exception is seen in the second pair of footprints where the third digit is flexed, apparently by coming in contact with the fore foot before that had been removed to make another step. In the succeeding footsteps of the series it will be observed that the toes are not bent, for in these cases the two feet did not interfere.

The reduction in the number of the toe marks of the hind foot in such ungulate forms of moderate size as *Hylopus* cannot be traced to forms with fewer toes, for though there are several genera that possess five toes on the hind foot, I know of none with four, except the blunt-toed genus *Nanopus* and the genus *Dromillopus* described on a later page. But in species of a smaller size, *Ornithoides* presents us with a form in which the three master toes of each foot, only, are represented in the footmark. Further than this the reduction in the number of digits seems not to have gone; at least the author is unacquainted with any Carboniferous species having a smaller number of toe prints.

In offering conjectures about the known animals which might be represented by these footmarks, Sir William Dawson, in his "Air-breathers," compares *H. Logani* to Dendrepeton, but in his latter work, in the Transactions of the Royal Society of Canada, he favours the view that the Microsauria, notably Hylerpeton and Hylo-nomus, are the creatures which most likely left these footmarks. These Sir William separates from the Labyrinthodonts, as their teeth do not have the involved foldings of the enamel which Labyrinthodonts possessed. Other writers consider the Microsauria as a section of this order. In any case the footprints of *Hylopus* conform more to those of Amphibia than to those of Reptiles.

Since writing the above, I have received a letter from Prof. Geo. T. Kennedy, of King's College, Windsor, N.S., who has examined the original of *Hylopus Hardingi* in the museum of that college; and he states positively that there is no basis for a fifth toe in the print of the fore foot. The slight protuberance in the cast of that foot in one of the figures, he says merely represents one of numerous little projections scattered over the stone, and is not actually related to the footprint alongside of which it occurs. This finally disposes of a possible fifth toe in the impression of the fore foot of *Hylopus*, as in neither *H. Logani* nor *H. Hardingi* can it be said to exist.

It is true that there is a fifth toe to the footprint of *Hylopus minor*, Dawson, but the heavy print of the sole in this marking does not conform to the ideal of Dawson's genus. On the whole, we conclude that five toemarks of the hind foot and four of the fore is the typical number for *Hylopus*.

HYLOPUS LOGANI, Dawson.

Pl. VI., fig. 1.

Stride, 7 inches (18 cm.); Straddle, 3 inches (75 cm.)?

Fore foot in front of the hind foot, 3 inches (75 mm.) from it.

Hind foot with five toes. The two inner progressively shorter inward. The four inner digits bear claws of which the three central are longer, the outer digit is weak and without claw.

Fore foot with four (?) toes, third more advanced; all three (or four?) had claws, the middle longer.

No sole is shown for either foot.

This animal appears to have been walking rapidly through soft mud, and to have been partly water-borne as the toes did not in all cases touch the mud, and this was especially the case with the fore foot.

We think there is reason to suppose that the footmarks in the type specimen though so exactly simulating in their position the footsteps of the two sides of a single track in the arrangement of the impressions of both fore and hind feet, really belong to different tracks running parallel to each other. In all the other footmarks of this age with which we are acquainted, the toes are either equal for the two sides of the foot, or (as is more usually the case, the *inner ones are shorter*). If we assume that the footmarks of this group are part of one track, it will have to be admitted that the *outer ones are the shorter*.

DROMOPUS, Marsh.

DROMOPUS VELOX, n. sp. Pl. II, fig. 2a, b.

Stride and Straddle unknown. The fore foot is placed somewhat in front of the hind and nearer the axis of the body than the hind foot. *Hind foot* length, 40 (or 45) mm.; width, 40 mm. The fifth digit somewhat off from the others; the spread of the toes nearly covers a quadrant; toes long and slender especially the third and fourth, the first is weak and about half of the length of these; the long toes show phalanges. Sole 12 (or 25) mm. long, 25 mm. broad, distinctly impressed. [The apparent extra length of the heel may be due to the foot having slidden in the mud. Angle of digits, I-V=95° I-II,=45.]

Fore foot. Length, 30 (or 35) mm., width, 15 mm., has 3 (or 4) toes and a rather long sole. [The only print of a fore foot known is not complete and leaves the number of toes doubtful.] Toes turned forward. Sole 12 (or 15) mm. long, 15 mm. broad. Angle of digits, II-IV,=35°.

This is not unlike Marsh's species *D. agilis*, but the toes are not so wide spread and the species is somewhat smaller. Several separate examples of the print of the hind foot are in the collection at Redpath Museum, but no consecutive series of tracks.

ASPERIPES.¹

This genus is characterized by having five toes on the supposed hind foot but only three on the supposed fore foot. The latter is usually placed behind the hind foot, sometimes midway between two prints of the latter.

In the hind foot the fifth toe sets off from the rest and is near the back of the footprint; the other toes also are widely spread and are

¹ Can. Rec. Sci., Vol. IX., No. 2, p. 99, Montreal.

progressively shorter to the first digit. The sole was large and rather deeply impressed.

The fore foot had three toes, of which the outer sets off from the other two, and the middle projects forward somewhat more than the others. The sole projects backward in a prolonged heel.

This form of footmark is not uncommon on the layers at the Joggins, and, like *Hylopus*, had often a rough surface, perhaps owing to the sharp claws with which the toes were furnished. It is necessary to separate it from *Hylopus*, because there are the impressions of only three toes to the fore foot, and because of the distinct impression of a sole to both fore and hind foot. The fact that there were only three toes to the fore foot also separates it from a number of genera that have been described by authors. On comparing the fore foot with the hind, it will be seen that the obsolete digits of the fore foot are probably the first and second.

The irregularity of the footprint in some species of this genus shows the flexibility of the toes, and the name of the genus alludes to the rough and irregular imprints left by animals of this kind.

Asperipes avipes n. sp. (Pl. Figs. 3a and 3b), is the type of this genus. Two other species are known.

It might be thought that in *Asperipes* the footprint showing the marks of only three toes is that of the hind foot. In many mammals, and in the alligator among the reptiles the foot with fewest toes is the hind foot. The long heel also of the footmark, determined as the fore foot, is a mark of the hind foot in many dinosaurs, as, for instance, in *Anomepus* and *Otozoum*, and it is therefore necessary to explain why it is supposed this anomalous relation of the two footmarks exist in *Asperipes*. We have not seen any consecutive series of footprints of the type species that will determine this relation, and the determination is based on the relation found to exist in the footprints of the other two species.

In the second species the disparity in size between the print of the fore and hind foot is somewhat greater than it is in the type species, in which we see some indication that the three-toed footmark, being the smaller, is that of the fore foot. But another character of greater importance appears in the footprints of this species, there is a series of tracks of this species showing eight footmarks, but of these only one is that of the three-toed foot; from this one might suppose that the common gait of this animal was bipedal, and that it only occasionally touched the fore foot to the ground. If this was its usual method of progression, it would explain the larger size of the hind foot, and the way in which the toes are spread out.

There is a third species, which I refer provisionally to this genus, Sir Wm. Dawson's *Hylopus* (?) *caudifer*. Here the disparity in size between the three-toed foot and the other is greater even than in the species last described, and the former has a lighter or shorter heel than the three-toed foot of the other two species. In this species also we note the infrequency with which the impression of the three-toed foot is found: on a slab showing eight footprints of a consecutive series, only one is that of the fore or three-toed foot.

As in the preceding species, one might infer that the animal was a biped. To this view, however, there is an objection, which arises from the presence of a groove which appears to represent the trailing of the belly or tail along the surface of the sand. If this animal were bipedal in its movement, it would not be unreasonable to suppose that this "tail" mark would sway from side to side: on the contrary, it continues strictly medial as far as it is impressed on the sand: a narrower median groove in the same track, however, is not strictly central.

In regard to the two last species, the evidence appears to indicate that the three-toed foot is the fore foot.

The generic name is in allusion to the rough and irregular footprint found in most of the species of this genus; hence a single footprint (or a pair) is often quite insufficient to determine the species.

The following species is the type of this genus.

ASPERIPES AVIPES n. sp. Pl. I, figs. 2a, b.

Stride about 3 inches (60 mm.), Straddle unknown. The print of the fore foot when present is placed a little behind the hind foot on the line of the stride.

Hind foot. Length, about 1 inch (25 mm.); width, nearly 1½ inch (35 mm.). Five (5) toes, the fourth and fifth set off from the other two and from each other; the first and second toes small, set off from the third and turned broadly inward, the third also turns inward. Sole 15 mm. long and over 15 mm. wide, rounded at the back where it is heavily impressed, and somewhat lobed on the inside.

Angle of digits, I-V=120°; I-II=45°.

The *fore foot* is 15 mm. long and 20 mm. wide. Three (3) toes widely spread, the outer directed broadly outward, the two others more directly forward; the first and second digits are obsolete. Sole elongate, 15 mm. long and 10 mm. wide. Angle of digits, (I-III or) II-V=65°; (I-II or) II-III=50°.

The sharpness and narrowness of the point of the toes in each foot seems to indicate that they were furnished with claws.

The fore foot makes a much lighter impression than the hind foot, but the print of the sole seems to be habitually present though often faint.

The stride and movement of the animal (if we are right in referring a certain series of tracks to this species) were variable, and the species in its hind foot resembles *Thenaropus McNaughtoni*, but that species does not show the fifth toe.

The tracks occur in a fine grained gray sandstone where there are frequent alternations of sandy clay. The weight of the animal has pressed the imprint through several layers of this clay.

ASPERIPES FLEXILIS n. sp.

Pl. I, figs. 3a-c. Pl. VI, figs. 3 and 4.

Stride, $5\frac{1}{2}$ inches (140 mm.). Straddle, 2 inches (50 mm.). Fore foot about $1\frac{1}{2}$ inches (30 mm.) behind the hind foot, and in one example somewhat outside of it.

Hind foot. Length about 30 mm., width about 25 mm. Five toes mostly directed forward except the fifth digit which is turned outward; the others are progressively shorter inwardly. Sole about 13 mm. long and 20 mm. wide. Angle of digits, I-V= 95° ?- 110° ; I-II= 40° ?- 45° . *Fore foot.* Length 33 mm., width 25 mm. Three toes, the outer one spreading from the others, turned outward, the other two directed forward and inward. Sole length (including heel 20 mm., width, 17 mm.; the heel as in the preceeding species is turned outward.

The toes in this species show great flexibility, crossing each other or turned in under the sole. The fossil is a cast in fine gray sand of tracks made on a muddy layer; from the long stride one might think the animal was in rapid motion, but the irregular position of the toes does not agree with this; the tracks may have been made by a narrow long legged quadruped.

This animal was remarkable for the length of its stride which was nearly three times as great as the straddle; also for the flexibility of its toes the positions of which are unusually varied.

This species is distinguished from *A. aripes* by its somewhat larger size, more evenly developed hind foot and by the swelling on the inside of the fore foot.

ASPERIPES CAUDIFER, Dawson, sp.

Pl. II, figs. 1a, b. Pl. VI, fig 5.

Stride, 3 (to 4) inches (75 mm.); Straddle, 3 inches (105 mm.).

Hind foot, length and width each $1\frac{1}{2}$ inches (40 mm.), five toes determinable; the first digit nearly obsolete; the fifth spreading away from the other three, which also spread from each other, but not so much as the fifth. The three other toes are directed somewhat outward; there are claws on these, and probably also on the fifth; the phalange of the two middle toes, bearing claws, is long. The sole sometimes only partly impressed and over one inch wide. There is usually a narrow transverse heel. Angle of digits, I-V=110°; I-II=70°.

Fore foot. Small, $\frac{3}{4}$ of an inch (20 mm.) long and nearly as wide. Has three toes which are widely spread, and furnished with claws. Sole half an inch wide and nearly as long. Angle of digits, II-IV=60°; II-III=50°. The print of this foot is usually wanting; in one instance where it is well preserved it is equally distant from the prints of the hind foot before and behind it, and is outside of the line of hind footprints.

The heavy body of this animal was low, and has brushed the sand forward from the crest of the ridges over which the animal was walking; in this way a broad shallow groove has been produced: on one side of this groove, for a short distance is a narrow and deeper groove, not exactly in the centre of the track which probably was produced by the tail (hence Dawson's specific name).

The track of this animal was on coarse grained gray sandstone and therefore is not well preserved. There are wave-markings upon it 2 to 3 inches apart from crest to crest of the ridges. The animal was travelling up the beach, from the water, and it turned somewhat in its course where the first tracks of the series figured were made. In walking the nails of the foot drew the sand in behind them and marred the distinctness of the track. The broad furrow made by the dragging of the belly over the sand, the width between the two rows of footmarks, and the short footstep, show that the animal had short legs and a heavy body.

This fossil footmark was classed by Sir Wm. Dawson with his genus *Hylopus*. Apart from the fact that it shows the impression of a sole as well as of toes and seemingly should be considered plantigrade, the number of toes of the fore foot which have left an impression are only three whereas in *Hylopus* as the author has limited it there are four. It is true that the animal used its claws with vigour in walking, and with these drew up the sand behind, making a rough instead of a

smooth impression, but this seems scarcely of sufficient force to hold it in the genus *Hylopus*. The roughness which is common character in *Asperipes* may in some cases be due to the print of the fore foot falling in the print of hind, and obscuring it.

This species is distinguished from the two preceding by the proportionately small size of the fore foot.

BATRACHICHNUS, Woodworth.

Among the three species of footprints of Carboniferous age from the Joggins described by the author last year¹ was one which from the number of toe prints and the slenderness of the toe were referred to *Dromopus*, Marsh. A knowledge of additional forms related to this species leads the author to think a reference to Woodworth's genus *Batrachichnus*, more appropriate. The type of this genus, *B. plainvillensis*, and these forms are small, with slender toes arranged in radiate manner, and made by animals that may have much resemblance to each other, but none of them have the strong median groove of Woodworth's species. If, however, we disregard this marking as not being of generic importance *Dromopus celer* may well be placed provisionally in this genus *Batrachichnus* until the value of the median groove as a generic distinction can be more clearly established.

Dromopus celer, the species from the Joggins above referred to, may well be placed in the genus *Batrachichnus*, but the following species is distinct by the number of its toe prints, though near *B. celer* in its size and general form; on account of the difference in the number of toes shown in the footprint it is placed in a separate genus.

DROMILOPUS n. gen. Pl. 1, fig. 5.

Small digitigrade batrachians. Toes slender, directed forward in a radial manner; imprint showing only four toes to each foot.

DROMILOPUS QUADRIFIDUS, n. sp. Pl. I. fig 5.

Stride, 26 mm. Straddle, 18 mm. The fore foot in the series of footmarks is placed behind the hind foot, and usually a little inside of it.

Hind foot. Length, 9 mm. Width, 8 mm. Four toes are impressed, of which the outer one sets off somewhat from the other three; these are long and slender, the third somewhat longer than the second,

¹ Brith. Nat. Hist. Soc. N.B., Vol. V., p. 103.

the fourth considerably shorter. The first digit is obsolete, and has left no impression. The sole is scarcely distinguishable.

Fore foot. Length, 7 mm., width the same. There are four toes somewhat evenly radiate, and covering a smaller angle than a quadrant; the two inner toes are somewhat longer than the two outer. The sole of the foot is nearly obsolete.

The track is impressed on a soft shaly layer in fine gray sandstone, but the fossil shows only the mould of the footprint. While the marks left by the toes are distinct, those resulting from the impression of the sole is scarcely noticeable.

The general aspect of the footmark of this species resembles that of *Batrachichnus celer*, but it is readily distinguished by the number of toe prints. Probably it was an animal of similar habits.

CURSIPES.¹

A series of footmarks, small and well preserved, appears to indicate another, but related genus. It is a light footprint, with long slender toes resembling *Batrachichnus* of Woodworth, but in place of four toes on the fore foot, there are only three. It differs from *Asperipes* in having a small sole to the hind foot, and in wanting a long heel in the print of the fore foot; also in the length and slenderness of the toes of both feet.

The print of the fore foot was distinct from that of the hind, and placed some distance behind it, sometimes half way to the next posterior impression of the hind foot.

These footprints appear to have been made by active animals having comparatively light bodies and long slender toes.

Cursipes Dawsoni n. sp. (Pl. I. Figs. 4a and b), is the type of this genus, and there was one other species.

The name is in allusion to the supposed rapid movement of the animal.

In distinguishing the fore and hind foot of this genus, much the same criteria are available as in the preceding genus. To mention first the size of the foot. Although in the typical species there is a continuous series of the three-toed impressions, alternating with those of the footmark showing five toes, they are invariably considerably smaller than the latter, and more lightly impressed. In the other species assigned to this genus, the impression of the fore foot is so light that it may be entirely overlooked. Often only the tips of the toes touched the ground and that very lightly; but if one were to observe the arrangement of these little pits, they would be seen to correspond to that of the three (or sometimes only two of the three) toes in the type species;

¹ Can. Rec. Sci., Vol. IX., No. 2, p. 102, Montreal, 1903.

and in the prints of the tips of the toes of the fore foot in species of *Asperipes*.

As in this latter genus, we must regard the foot which gives a three-toed impression as the fore foot; otherwise the weight of the body must have rested chiefly on the fore feet, which seems to be unnatural.

CURSIPES DAWSONI n. sp. Pl. I, Fig. 4.

Stride $2\frac{1}{2}$ (to 3) inches, 65 mm. (to 75 mm.). Straddle, $2\frac{1}{4}$ inches (60 mm.). Fore foot placed inside of the hind foot, smaller.

Hind foot. Length, 16 mm.; width, 19 mm. There are five toes; fifth toe much spread from the others; the four inner toes progressively shorter inward; the third and fourth toes are directed somewhat outward, the first and second forward or somewhat inward. The sole of the foot is obscure, and about 7 mm. long and 12 mm. wide. No claws are determinable. Angle of the digits, I-V= 110° to 135° ; I-II= 50° .

Fore foot 15 mm., width 12 mm. There are three toes; outer toe spreading from the two others, which are less divergent from each other. There is a spur from the back of the foot on the outside that may represent the fifth digit. The sole is obscure, perhaps 6 mm. long and 7 mm. wide. Fore foot as heavily impressed as the hind. Angle of incidence of the digits, II-IV= 40° - 45° ; II-III= 35° .

This series of footprints is impressed on a fine grained muddy layer in fine grained gray sandstone with a somewhat undulated surface, and pitted with worm burrows. The footmarks are in round hollows made by the weight of the animal, and the mud has run in to some degree into the footprints so as to narrow and obscure the impressions of the toes. There is a good series of impressions of the feet of the left side, but those of the right are broken away so that only a toe each of three footmarks are left.

This species is similar in type to *Dromopus agilis* Marsh, but there are only three toes on the fore foot. It has perhaps a nearer relation to the genus *Asperipes*, but although the number of toes on the fore foot is the same, it lacks the long heel to the sole of the fore foot which is found in that genus. It has a general resemblance to *Palaeosauropus primævus* Leidy, but that species is of more massive proportions and the fore foot has four toes, while this species has three.

CURSIPES LEVIS n. sp. Pl. II, Fig. 3.

Stride, 60 mm. Straddle, 27 mm.

Very faint impressions of the fore foot are present; it is placed behind and somewhat outside that of the hind foot.

Hind foot. Length, 13 mm.; width, 13 mm. There are four toes which are widespread, covering more than a quadrant. The fifth digit is set off somewhat from the others, which are spread at an angle of 70° or 80° ; the fourth digit is considerably longer than the others; the second digit is short: these, and the third have no claws; the first digit is wanting. No sole to the foot is traceable. Angle of incidence of the digit II-V= 100° (to 110°); IV-V (30° ? to) 55° .

Fore foot. Only the tips of the toes appear; these are three in number, and somewhat regularly placed, having the outer longer and the inner somewhat shorter than the middle one. The sharp indentation would seem to indicate that there were claws on these toes.

The very light impression of the toes of the fore foot would seem to indicate that the animal could walk on its hind feet. The absence of a sole to the foot would indicate that the animal walked, bearing the weight of the body on the hind feet or that it was partly water-borne.

This species is distinguished from *C. Dawsoni* by the narrow straddle, which is only half that of *C. Dawsoni*; also by the print of the fore foot being somewhat outside that of the hind foot; also by the very light print of the fore foot.

BARILLOPUS.¹

Under the genus *Baropus*, Marsh, the writer last year, described a neat little footmark from the Joggins shore, which, on further consideration, he thinks should be separated as the type of a new genus.

It is much smaller than Marsh's type of *Baropus*, and has a broad and rounded sole to the hind foot, while that of *Baropus* projects backward in a heel. The parallel grouping of the three inner toes, separate from the outer one, is also a distinctive character.

All the species were small, short legged, low-bodied animals, apparently of sluggish habit.

Barillopus unguifer, Matt. (Pl., Figs. 5a and 5b) is the type. There are two other species from the Joggins.

The name is a diminutive of *Baropus*=heavyfoot.

In *Barillopus* there seems less reason to question the relation of the two kinds of footmarks than in the two genera first described, because one is not only larger than the other, but the constant forward direction of most of the toes in this footmark would indicate a hind foot. If one examines the footprint left by a frog or an alligator, he will be struck by the radiate arrangement of the toes of the fore foot as compared with those of the hind; hence it seems quite in accord with the ordinary attitude of the toes in the *Crocodylia* and the tailless amphibians

¹ Can. Rec. Sci., Vol. IX., No. 2, p. 103, Montreal, 1903.

that these footprints should be relatively what we have assumed them to be.

BARILLOPUS ARCTUS n. sp. Pl. III., figs. 1a-c.

Stride, 12 mm. Straddle, 9 mm.

The fore foot is placed under the hind foot or a little outside of it, and the impression of the two feet are thus confused.

Hind foot. Length 10 mm.; width 7mm. 4 toes, the outer rather broad and blunt, the three inner slender, nearly parallel, directed somewhat outward, bearing slender claws. Sole suboval, strongly impressed in the middle, nearly as long as the toes. Angle of digits, I-IV= 10° ; I-II= 0° .

Fore foot. Length, 5 mm.; width, 5 mm. 3 toes, wide spread and of nearly equal length. Sole, small, suboval. Angle of digits, II-IV= 65° ; II-III= 45° .

This series of tracks consists of about twenty parts and is a mould of soft grey sandy shale; the tracks approximate in going forward and the straddle is thus narrowed.

The mud layer on which these tracks are preserved has a very smooth surface, but there is one below that is pitted with rain-drops, and one above that has coarse depressions.

This species differs from *B. unguifer* in the narrower impression, and in the narrower, and weaker fifth digit; the three other digits are proportionately longer and narrower than in that species, and the fore foot is smaller.

BARILLOPUS CONFUSUS n. sp. Pl. III., figs. 2a, b.

Stride, about 6 mm. Straddle, 13 mm.

The print of the fore foot has not been identified, but that of the hind foot, owing to the short stride is set partly on the toe mark of the antecedent impression of the fore foot.

Hind foot. Length, 9 mm.; with (when the fifth digit is extended), 8 mm. There are four toes of which the outer is widely spread from the others; the other three are sub-parallel and extend forward; they are weak and seemingly have no claws; the fourth digit is weaker than the second and third, and the first is obsolete, or at least made no impression. Sole of this foot is suboval, strongly impressed; it is shorter than the toes, and about one-third wider than long. Angle of the digits, V-II= 80° ; V-IV= 55° .

Fore foot. The impression of this foot has not been distinguished.

There is a sharp keel-mark along the middle of the track of this animal, having a smooth space on each side of it, somewhat like *Asperipes*

caudifer, Dawson; but in that the smooth space is much narrower in proportion.

This track is on the same fine, gray mud or shale as *B. arctus*. The very closely set footsteps of this animal obscure the marking, and would indicate an animal moving slowly, or with very short legs. The body was placed so low that it dragged on the ground as the animal moved along. The track has a curved course, nearly parallel to that of *B. arctus*, and it moved in the same direction as that species. Perhaps it was made by the female of that species.

ORNITHOIDES.¹

Under *Hylopus* (?) *trifidus*, Sir Wm. Dawson has described a peculiar little track in which the number of toes is reduced to three on each foot. It has thus fewer toes than any other form of this fauna, and seems worthy of a separate generic name.

The toes are all directed forward in a fan shape, and thus have a distant resemblance to those of the wading birds, but are much more massive.

The track left by this creature resembled that of *Barillopus* in two respects; first that the stride was short, and second that the print of the fore foot was close behind that of the hind and apt to be confused with it. But it differed from the footstep left by animals of that genus in having a small and narrow sole; so small that Sir Wm. Dawson referred it provisionally to *Hylopus*.

These little animals had broad bodies, and probably were sluggish in their movements. The track was as wide as the space between each footmark in the row of footsteps.

Hylopus (?) *trifidus*, Dawson (Pl. Figs. 6a and 6b) is the type of this genus. The name *Ornithoides* is an allusion to the bird-like track, with three toes directed forward in a radiate manner like wading birds.

ORNITHOIDES TRIFIDUS Dawson Pl. IV., figs 1a to c.

Stride, about 20 to 22 mm. Straddle, 20 mm.

In this species there are three toes on the hind and fore feet respectively. Generally the impression of the fore foot is covered by the hind; in two or three instances the former is behind the latter, but less than its own length distant from it.

Hind foot. Length, 9 mm.; width, 7 mm. There are three toes, of these the first set off from the second and third, which are longer

¹ Can. Rec. Sci., Vol. IX., No. 2, p. 104, Montreal, 1903.

and directed forward. The sole is considerably shorter than these toes, and is wider than long. Angle of digits, II.-IV.= 30° ; II.-III.= 15° .

Fore foot. Length and width, equal, about 6 mm. The three toes are more widely spread in proportion to those of the hind foot, and are of nearly equal length. The sole is shorter than the toes, and much shorter than wide. Angle of digits, II.-IV.= 45° ; II.-III.= 35° .

The track is a series of about 23 impressions, made in a curving course across a slab of fine grained, dark gray sandstone. In most of the footprints that of the fore foot is obliterated by the hind, but in a few cases it shows as a separate print, just behind the hind foot.

This species might be compared with *Aptichnus bellus* Hitchcock, which also had a triangle impression for both feet; but in the Triassic species the stride was vastly greater and the animal evidently quite different. As the stride and straddle in *Ornithoides trifidus* were so nearly equal, it may be inferred that it was not walking rapidly when this series of footsteps was made.

ORNITHOIDES (?) ADAMSI n. sp. Pl. IV. fig. 2.

A small species with long slender toes. It may be associated with *O. trifidus*, though the examples do not exhibit the characters of this genus fully.

Stride, 25 (or 50) mm. Straddle, 18 mm.

The relation of the hind to the fore foot is not clear.

Hind foot, 16 mm. long and 10 mm. wide. First digit not seen; the visible toe-prints are those of the second, third and fourth digits; of these, the second and third are long and slender and nearly parallel; the third sets off somewhat from the others, but all three are directed forward. The second and third digits make a heavier impression than the others. The sole in this footprint is quite small, or obsolete. Angle of the digits, II.-IV.= 15° ; II.-III.= 5° .

The impression of the fore foot has not been recognized, unless it is similar to the hind and alternates with it. On the other hand, it may be that the fore foot did not touch the ground at all in this series of footprints, and that all the imprints preserved are those of the hind foot, in which case the stride was 25 mm.; a more usual relation of straddle to stride than the other suggested, which would refer half of these impressions to fore feet.

NANOPUS Marsh.

NANOPUS OBTUSUS n. sp. Pl. V., figs. 1a-d.

Stride and straddle unknown.

Fore foot placed outside, and somewhat distantly behind the hind foot in one example.

Hind foot. Length, 20 mm.; width, 22 mm. There are four toes, the first digit being absent. The fifth sets off from the others; the fourth digit is longest, and is directed forward; the other two are progressively shorter and are directed inward. The first digit appears to be indicated by a round lobe behind the fourth. Sole, 10 mm. long and 16 mm. wide, and it is somewhat quadrate behind. The extremities of the toes are obtuse and show no trace of claws. Angle of incidence of the digits, II.-V.= 80° to 90° ; IV.-V.= 40° to 45° .

Fore foot. Length, 25 (?) mm.; width 12 (?) mm. (This foot-mark is probably distorted and has gained in length at the expense of the width). Three toes are preserved of which the outer is longest; the others are progressively shorter inward. The points of the toes are obtuse, and there is no trace of claws. The sole is subquadrate (?), and a strong ridge, perhaps accidental, runs from the inner corner of the heel to the base of the outer toe; behind this a flattened area (which appears to be a part of the sole), bears a faint lobe or swelling.

This species differs from *Nanopus caudatus*, Marsh, in the form of the fore foot, and in other respects.

NANOPUS QUADRATUS n. sp. Pl. V., figs. 2a and b.

Stride, 42 to 47 mm. Straddle, 30 mm.

Fore foot print behind the hind foot and a little outside of it.

Hind foot. Length, 12 to 13 mm.; width, 13 to 14 mm. There are four toes. The fifth digit is short and somewhat separated from the others; fourth digit somewhat longer than the others; it and the two next inward digits are nearly equally radiate; there is perhaps a trace of the fifth digit in a swelling of the heel. Sole, 6 mm. long and of the same width; it is quadrate in form and has an impressed lobe at each angle. There are claws to all the toes. Angle of the digits, II.-V.= 110° ; IV.-V.= 60° ; II.-III. and III.-IV. each 25° .

Fore foot. Length, 13 mm.; width, 11 mm. Three toes are distinctly shown. The fifth digit is very short and faint; the fourth is long and sets off from the other two; the third digit projects farthest forward the second is shorter and turns inward. There are claws to

the three toes. Sole 6 mm. long, 6 mm. wide, subquadrate; there is an impressed lobe at the inner angle and a very faint lobe at the outer corner. Angle of digits, II.-IV.= 65° ; II.-III.= 20° ; III.-IV.= 45° .

This species is remarkable for the heavy square sole to the hind foot, and the fore foot has a sole similar in form though the outer triangular half is only lightly impressed, and often is not seen. The quadrate sole and conspicuous claws are not usual characters in *Nanopus*.

BAROPEZIA.¹

Sauropus [Lea?], as defined by Sir William Dawson, consisted of "large plantigrade animals, probably *Labyrinthodonts*, or allied. Hind foot usually larger, five toes."

The track described by Dr. Lea under this name was not very different from that which Dr. King had previously described inadvertently under the name of *Sphæropezium* (changed by him in the same year to *Thenaropus*), either in size or in general appearance. There were, however, some important differences. *Sauropus* was represented as having a median "tail mark" or groove, and, so far as the figure shows, the fore foot left three toe prints in place of four as in *Thenaropus*.

Unless, therefore, *Sauropus* is made very broad in its scope, it will not include *S. Sydneysis*, in which the formula of the toes is 4—3; that is four on the hind and three on the fore. Also the form of the sole and toe prints is in many respects quite different from Lea's *Sauropus*, and more like King's *Sphæropezium*. There is also in *S. Sydneysis*, Dawson, no median furrow between the footprints; in this it differs from Lea's species. It would seem necessary, therefore, to separate Dawson's species from *Sauropus*.

But there is a cogent reason why *Sauropus* should be used neither for Lea's nor Dawson's species. The name was preoccupied, according to O. P. Hay, by E. Hitchcock, for a genus of Triassic footprints of a different type.

Palæosauropus has lately been offered by Dr. O. P. Hay as a generic name for Dawson's species, above discussed, but as Dr. Hay refers to Lea's *Sauropus* as the type of his genus (being the first described) it obviously will not apply to Dawson's species, which is of quite a different type, as above shown. We therefore, propose the name *Baropezia* for this type.

Baropezia had the print of four toes on the hind foot and three on the fore; these toe prints were round, several were detached from the

¹ Can. Rec. Sci., Vol. IX., No. 2, p. 105, Montreal, 1903.

print of the sole, and all were without the trace of a nail. The impression of the sole was heavy, with usually apophyses or swellings on some part of the sole. The impression of the fore foot is smaller than that of the hind, and usually placed behind it.

Judging by the length of stride, these animals, notwithstanding their weight, were of active habit, and travelled rapidly over the sand.

Sauropus Sydnensis, Dawson (Can. Rec. Sci. Pl., Figs 1a and 1b) is the type of Baropezia, and there is one other species.

The generic name is in allusion to the heavy impression made by the sole of the foot.

In the type species of this genus the two footmarks are much alike; there is not a long heel on either foot to distinguish them; the number of toes, however, is distinctive. In both feet the normal number of digits is reduced, and the one with three toes may be seen to be smaller than the other, and is therefore assumed to be the fore foot.

It may also be mentioned (though not much weight can be laid upon this argument) that in the series of footprints which indicates this species, one of the three-toed footprints fails to appear; the series of footmarks runs across a strongly wave-marked slab, and this footmark has failed not in hollow of the ripple where the impression might naturally be wanting, but on the ridge of the wave mark; from this one might suppose that the weight of the animal was carried by the four-toed foot which would, therefore, be the hind foot.

But when an examination of the footprints of the second species of this genus is made, there is much greater reason for concluding that the three-toed foot is the fore foot. The impression is not half as large as that of the four-toed foot; and, moreover, while in the latter the toe prints are arranged on one side of the print of the sole, in the former they are arranged radially around it.

BAROPEZIA SYDNENSIS Dawson, Pl. V., figs. 3a-b.

Stride, $8\frac{1}{2}$ inches (215 mm.); Straddle, 5 inches (310 mm.).

Hind foot. This shows four toes. Length, $2\frac{3}{4}$ inches (70 mm.); width, 2 inches (50 mm.). Spread of the toes, 1st to 4th, $2\frac{3}{4}$ inches (70 mm.). Sole of the foot oval; inside ball of the foot deeply indented. (The first digit may be potentially present in this lobe). Angle of digits, I to IV=80°; I to II=30°.

Fore foot. Placed 3 inches (75 mm.); (another $2\frac{1}{2}$ inches, 65 mm.) behind the hind foot. Length of fore foot, 2 inches (50 mm.); width, $1\frac{3}{4}$ inches (45 mm.). It has three toes, which are 2 inches (50 mm.) apart, outside measurement. Sole proportionately wider than in the hind foot. Inner ball of this foot quite heavily impressed, the

first digit may be potentially present in this lobe; on the supposition that the two outer digits of this foot, one on each side are atrophied (as is usually the case with these Batrachian footprints), otherwise we may assume that the first and second digits are contained in the large lobe on the inside of the sole-print. Angle of digits II-IV= 80° ; II-III= 50° .

The toes of both feet are round and blunt, and show no trace of claws.

The track of this creature preserved on the slab in Redpath Museum consists of two casts of the left hind foot and one of the left fore; and of the right side a similar number of casts. It would seem that the fore feet were not always used in walking.

These tracks are preserved on a fine-grained gray sandstone on which was a thin film of mud; this film preserved minute striæ due to seaweed, etc., swept backward and forward by the sweep of the waves. On the layer on which these markings are preserved are wave markings whose crests were 6 to 8 inches apart. The animal that made the tracks was walking directly up the beach.

BAROPEZIA ABSCISSA n. sp. Pl. V., figs. 4a-b.

On the same slab as that carrying the track of *B. Sydnensis*, but on a different layer was a print having the following characters:

Stride of hind feet $5\frac{1}{2}$ inches (?) (140 mm.), of fore feet $7\frac{1}{2}$ inches (195 mm.). Straddle not known.

Hind foot. Length, $1\frac{4}{5}$ inches (45 mm.); width, $1\frac{1}{2}$ inches (40 mm.). This footprint has four toes with a spread of toes of 2 inches (50 mm.). Sole of the foot large, subtriangular, rather evenly impressed, except at the back where it is abruptly cut off by a line nearly at right angles to the length, at this part the sole is more deeply impressed than at the front and sides. Angle of digits, II-V= 90° ; IV. = 30° *Fore foot.* Length $1\frac{3}{10}$ inches (45 mm.); width, $1\frac{1}{2}$ inches (40 mm.). There were four toes; spread of the toes, $1\frac{1}{2}$ inches (40 mm.); three are detached from the sole print, the fourth is imbedded in its margin. Angle of the digits, II-V= 80° ; IV-V= 30° . The sole of the foot is somewhat bilobed and is heavily impressed, there is a sinus at the back between the lobes.

An impression of the wrinkled skin of the sole of both feet has been preserved on the surface of the mud which carries the impression of the footprints. No traces of claws were observed. The animal that made the track was walking up the beach with rather long strides.

Only the cast of the feet on the right side of the track have been

preserved, and there are two prints each of the hind and the fore foot of that side.

The track is on a firm, fine grained gray sandstone; a thin film of mud on the sand preserved accurately the impression of the footmarks, and of striæ made by seaweed, etc.

MEGAPEZIA.¹

The peculiar shape of the print of the hind foot appears to separate this from any described genus, though there is a figure given by King in *American Journal Science*, without any name attached, which, in its very large sole, may be compared to Megapezia; that, however, is represented as having five toes to the hind foot, while in this new genus there are only four. Yet while the number of toes on this foot is four, that on the fore foot is five; it thus reverses the number of toe prints of the hind and fore foot, usually observed in such Palæozoic footprints as have nine toes on the two feet collectively. To this relation, in the number of the toe prints; but we have a parallel in the footprints of the alligator, which also has four toes on the hind and five on the fore. The resemblance extends to the attitude of the toes, which are turned forward in the hind foot, but radially arranged in the fore foot. There is this distinction, however, that the peculiar backward curve of the fifth digit of the hind foot in Megapezia is not found in the alligator.

In the hind foot of Megapezia the fifth digit sets off from the others, and the end is strongly curved backward. The toes are rather short and blunt (though perhaps having claws); the second, third and fourth digits are somewhat grouped, and directed forward and the first appears to be the digit that is wanting. The sole of the foot is large, but not heavily impressed.

The fore foot has a short and weak fifth digit, and the others are progressively shorter than the first; they are proportionately longer than those of the hind foot. The sole is short, except behind the fourth and fifth digit, where it extends into a long heel somewhat as in *Asperipes*.

These animals were of good size and had a long stride, so perhaps were active in their habits, and as the impression on firm sand was strong, they would have been rather heavy animals.

The type is *Megapezia Pincoi* of the Lower Carboniferous measures at Parrsboro, N.S. (Can. Rec. Sci. Pl., Figs. 2a and 2b), and the generic name is in allusion to the large size of the sole of the hind foot.

In this genus the usual signs seem to designate without doubt which is the hind and which the fore foot. First the larger size of the

¹ Can. Rec. Sci., Vol. IX., No. 2, p. 107, 1903, Montreal.

sole in the foot bearing four toes shows that the weight of the body was borne by this foot. The smaller number of toes and the forward direction of three point to a greater specialization of this limb for walking, etc.

On the other hand the full number of digits on the fore limb and the radial arrangement of the toes point to a varied use of this limb, for prehension as well as for walking, for which latter purpose it seems to have been habitually used. Every feature appears to point to this as the print of the fore foot of the animal.

If it be such, however, one cannot fail to note the strong resemblance between this which we have determined as the fore foot of *Megapezia*, and that which appears to be hind foot of *Asperipes*. This is obvious on comparing Figure 2*b* of Plate in Can. Rec. Sci., with Figure 3*a* of the same plate.

It may be thought that we attach too much importance to the size and weight of the footmark as determining which marks were made by the fore, and which by the hind feet, since some amphibians show the fore limbs to be stouter, and in some (*Siren*) the hind limbs are quite wanting. But in such a possible condition amongst the extinct forms of the Carboniferous time, we cannot but suppose that if the animal were walking on the land, very marked evidence of the unsupported posterior part of the body would be seen, in a groove or trail along the surface of the mud, made by the body or tail; the absence of a "tail" mark in most cases, as well as the disparity in size of the fore and hind foot prints in many species, supports us in the surmise that in some cases at least the body was sustained chiefly by the hinder limbs.

MEGAPEZIA PINEOI n. sp. Pl. II., figs. 4*a*, *b*. Pl. VI., fig. 6.

Stride, 9 inches (235 mm.). Straddle, 4 inches (105 mm.).

The fore foot was placed in front of the hind foot and 4 inches (105 mm.) from it.

Hind foot "plantigrade." Length, $2\frac{1}{2}$ inches (65 mm.); width, 2 inches (50 mm.). There were four toes, the fifth digit leaving no mark. The three middle digits are nearly parallel, but turned somewhat outward, the fifth digit thumb-like and turned strongly outward, and backward at the tip; there was a claw; the other toes also may have had claws. The sole of this foot was broad and long (a fifth longer than broad), but only faintly impressed at the back; most heavily impressed on the inside of the print. Angle of the digits, II.-V.=70°; IV.-V.=50°.

Fore foot "plantigrade." Length and width each about 2 inches (50 mm.). There are five toes, spreading, the third and fourth longest; the first toe was heavily impressed and had a strong claw; the other toes probably had claws. The sole was prolonged into a rounded lobe on the outer side; it was about an inch in length each way. The fore foot was in line with the hind. Angle of digits, I.-V.=105°; IV.-V.=10°.

This animal was Cheirotheroid in the separation of the fifth digit of the hind foot from the others. This and the fact that it had only four toes on the hind foot, and the heavy sole of this foot, distinguish it from *Hylopus Logani*. The tracks are preserved on a fine grained layer of gray sandstone, having wave undulations, and somewhat pitted with raindrops. After the animal walked over the surface a fine soft mud washed into the tracks and helped obscure them, though the original impressions appear to have been made on a surface so soft that the mud at the sides of the toeprints partly flowed in.

The more numerous toes on the print of the fore foot might lead to the supposition that it was the hind foot; but the other is regarded as the print of the hind foot for the following reason. The sole of the footmark is longer and larger; the fifth digit sets off decidedly from the others; the other three digits are subparallel, in this latter feature the footprint compares with that of *Barillopus*. On the contrary the print of the fore foot though it has a sole of considerable size, has the toe prints regularly radiate and the full number of digits.

The animal was walking nearly parallel to the wave undulations of the layer of sand on which it trod, and at a rapid pace.

GENERAL REMARKS.

The relation of many of these footprints to those of Amphibians is evident from a comparison with the footprints of a frog, as given by Dr. Jas. Deane in his posthumous work "*Ichnographs of the Sandstones of the Connecticut River*," Boston, 1861, Ed. T. T. Bouvé. See *Can. Rec. Sci.* Plate 1, Figure 1. This shows the habit of these creatures of placing the print of the fore foot in the line of the series of footmarks within that of the hind (*Cursipes Dawsowni*; *Dromillopus celer*, *Baropezia sydnensis*, *B. abscissus* are examples).

Then as regards the number of toe marks, in the frog the hind foot exceeds the fore foot, and the toe marks are closer together, but we do not observe the peculiar separateness of the fifth digit which is seen in many tracks of the Carboniferous animals, and markedly in some of those of the Trias. Also in regard to the first digit it may be noted

that it not infrequently takes on the appearance of a lobe rather than a toe (though we know it to be undoubtedly the latter) and so is like many Carboniferous tracks, where we are sometimes unable to determine whether a certain impression is due to a toe, or only to a projecting lobe of the sole, such as is made by the "ball of the foot" in a human footprint. *Nanopus quadratus* and *Baropezia Sydneensis* are examples.

The wide radiation of the toes in the mark of the fore foot in the frog is also paralleled by the corresponding attitude of the toes of the fore foot in many Carboniferous tracks; in this frog the area covered is a semicircle, but in most Carboniferous tracks it is not more than a quadrant (*Megapezia Pineoi*); however, this in many cases is due to the lessened number of toes, which in the Carboniferous tracks is often reduced to three. See *Asperipes caudifer*, *A. avipes*, *A. flexilis*, *Barillopus arctus*, *Cursipes Dawsoni*.

The track of the frog is essentially "digitigrade" (to use Sir Wm. Dawson's expression), and finds its parallel in this respect in some tracks referred to the genus *Hylopus* of Dawson.

At plate 21 of *Ichnographs of the sandstones of the Connecticut River*, Dr. Deane has given the track of a modern alligator in which we have a set of footsteps coming under Dr. Dawson's class of "plantigrade"; the sole of both fore and hind foot is distinctly marked. The offsetting or separateness of the fifth digit in the fore foot of this animal is plain, but the corresponding digit is wanting in the track of the hind foot.

In the fore foot the radiation of the toes, as in the frog, covers a semicircle, but if we should take off the two outer toes we should have a grouping of the toes corresponding to that in the three toed species of the Carboniferous, such as *Barillopus arctus*, *Cursipes Dawsoni*, *Megapezia Pineoi*. We note, however, that in the alligator the toes of the fore foot as a whole turn outward while those of the frog turn inward, and this inward turning of the toes is the common arrangement in the Carboniferous forms. See *Hylopus Logani*, *Dromillopus erectus*, *Nanopus obtusus*, *N. quadratus*, *Baropezia Sydneensis*, *B. abscissus*.

In the hind foot of the alligator there is the same preponderance of size over the fore foot which is seen in the Carboniferous footprints; and in both the fore and hind feet of the former the heavy mark made by some of the phalanges is counterfeited by corresponding pits in the fossil footprints. *Hylopus caudifer*, *Barillopus arctus*, *Cursipes Dawsoni*, *Baropezia Sydneensis*, *B. abscissus*. Also the great size and length of the sole in the footprint of the alligator are duplicated in many Carboniferous tracks, *Baropezia abscissus*, *Megapezia Pineoi*, *Nanopus quadratus*; though this is not a universal character, the print

of the fore foot is sometimes found proportionately longer than that of the hind. *Asperipes avipes*, *A. flexilis*, *Baropezia Sydneensis*.

The "caudifer" species of the Carboniferous tracks have their counterpart in the alligator track, reproduced by Dr. Dean, where the imprint of the keel of the belly and its scutes have left a distinct impression between the footmarks of the right and left sides of the body. *Ilyopus caudifer*, Dn., *H. minor*, Dn., *Batrachichnus plainvillensis*, Wood., *S. primævus*, Lea (sp.), *Nanopus caudatus*, *Notolacerta Missouriensis* Btt.

While the foot prints of the frog and the alligator reproduce many characters which are to be found in the Carboniferous footmarks, there are peculiarities of form in the latter that are not to be found in the former, and we are led to suppose that neither the modern Amphibians, nor the Reptiles, nor both together will present to us all the varied modifications which the ancient footsteps of the Carboniferous age record; and we are open to accept the conclusion of Sir Wm. Dawson that the Labyrinthodonts and the Microsaurians are responsible for many of these characteristic batrachian tracks.

The habits of these animals thus known from their footprints left in the sand and the mud is a matter of conjecture, though the number of those preserved at the Joggins suggest the existence there for some time of such estuarine conditions as conduced to the preservation of that wonderful series of tracks of the Triassic period which were found by Prof. Hitchcock, Dr. Deane and others at the famous locality of Turner's Falls, on the Connecticut river.

In a number of instances we have observed that the Carboniferous tracks run up or down the mudflat, as though the animals that made them were in the habit of visiting the shore at low tide, where not only would they find a larger assemblage of animals of the sea of the lower orders, but where would also be dead and dying organisms among which these scavengers from the land found appetizing morsels.

On the other hand, if any of these animals were marine as are some of the Chelonians, they may like the turtles have resorted to the beach for the purpose of laying their eggs in the dry sand at the top of the beach. A practise of this kind would have given rise to the numerous tracks that go up and down the beaches of Carboniferous Time at the Joggins.

In looking for a relation in the length of the stride and the width apart of the right and left footmarks, one is puzzled to note how footmarks which are sufficiently alike to be placed in the same genus, differ from each other in this respect, as the following list will show. In this

list the width of the track is taken as the unit, and the relative space between the pairs of hind or of fore feet shown:—

<i>Asperipes flexilis</i>	2·8	<i>Nanopus minor</i>	1·5
<i>Hylopus Hardingi</i>	2·5	<i>Dromillopus quadrifidus</i> ...	1·45
H—— <i>Logani</i>	2·4	<i>Barillopus arctus</i>	1·3
<i>Ornithoides Adamsi</i>	2·3	<i>Pseudobradypus unguifer</i> ...	1·2
<i>Crusipes levis</i>	2·2	<i>Ornithoides trifidis</i> ...	1·0 to 1·1
<i>Megapezia Pineoi</i>	2·2	<i>Asperipes caudifer</i> ...	1·0 to 0·75
<i>Baropezia Sydensis</i>	2·0	<i>Barillopus confusus</i>	0·5
<i>Cursipes Dawsoni</i>	1·5		

In this list the blunt-toed species hold a middle place, and those whose bodies or tails trailed upon the ground took much shorter steps than the others. Many of the long-toed forms, though not all, had a long stride.

EXPLANATION OF PLATES.

PLATE I.

- Fig. 1. *Hylopus Hardingi*, Dawson. *a.* Mould of right hind foot; *b.* Mould of right fore foot. Both natural size. From Lower Carboniferous sandstones. Parrsboro, N.S. See p. 83.
- Fig. 2. *Asperipes avipes* n. sp. *a.* Mould of left hind foot; *b.* Mould of left fore foot. Both natural size. From Coal Measures. Joggins, N.S. See p. 88.
- Fig. 3. *Asperipes flexilis* n. sp. *a.* Mould of left hind foot with second and third toes bent at the joint of the ultimate phalange; *b.* Mould of a print of the same foot, toes extended; *c.* Mould of left fore foot, second toe apparently crossing the third toe. All natural size, and from Coal Measures. Joggins, N.S. See p. 89.
- Fig. 4. *Cursipes Dawsoni*, n. sp. A slab showing a series of foot prints of the left side and the toes of those of the right side. The larger prints were made by the hind foot, and are connected by dotted lines. The smaller trifold prints are those of the fore foot. Natural size. From the Coal Measures of Joggins, N.S. See p. 93.
- Fig 5. *Dromilopus quadrifidus*, n. sp. A slab bearing a mould of a series of footprints. The prints of the hind feet are connected by a dotted line. Natural size. From the Coal Measures. Joggins, N.S. See p. 91.

PLATE II.

- Fig. 1. *Asperipes caudifer*, Dawson, sp. *a.* Mould of print of the left hind foot. The slender toes flexed at the ultimate joint; *b.* Mould of the left fore foot. Both natural size. From Coal Measures. Joggins, N.S. See p. 90.
- Fig. 2. *Dromopus velox*, n. sp. *a.* Mould of the right hind foot showing several joints in the long slender toes; *b.* Mould of the right fore foot, the fourth toe apparently was broken off. Both natural size. From Joggins, N.S. See p. 86.
- Fig. 3. *Cursipes levis*, n. sp. A series of footprints. The prints of the hind feet are connected by dotted lines. Only the tips of the toes of the fore foot touched the mud on which the animal was walking. Natural size. From Coal Measures. Joggins, N.S. See p. 93.
- Fig. 4. *Megapezia Pineoi*, n. sp. *a.* Mould of right hind footprint; *b.* Mould of right fore foot. Natural size. From Lower Carboniferous shales. Parrsboro, N.S. See p. 103.

PLATE III.

- Fig. 1. *Barillobus arctus*, n. sp. *a.* Mould of the left hind foot; *b.* Mould of the left fore foot. Both magnified $\frac{2}{3}$; *c.* Mould of a series of foot prints of this species of the natural size; the print of the hind foot obscures that of the fore; the footmarks of the right and left sides converge toward the front. From the Coal Measures. Joggins, N.S. See p. 95.

- Fig. 2. *Barillopus confusus*, n. sp. *a*. Mould of the print of the right hind foot. Magnified $\frac{3}{1}$. *b*. Mould of series of footprints showing the short step and the impression of the tail or of the keel of the body. Natural size. Both from Coal Measures. Joggins, N.S. See p. 95.

PLATE IV.

- Fig. 1. *Ornithoides trifidus*, Dawson, sp. *a*. Mould of the right hind foot; *b*. Mould of the left fore foot. Both magnified $\frac{2}{1}$; *c*. Mould of a series of prints of the hind foot with a few of the fore foot. Natural size. All from Coal Measures, at Joggins, N.S. See p. 96.
- Fig. 2. *Ornithoides* (?) *Adamsi*, n. sp. A series of footprints in which sometimes two, sometimes three toe marks are impressed. Natural size. From Coal Measures. Joggins, N.S. See p. 97.

PLATE V.

- Fig. 1. *Nanopus obtusus*, n. sp. *a*, *b*, *c*. Mould of the right hind foot of three different series of tracks, showing difference of form; *d*. Mould of left fore foot showing faintness of the outer part of the sole; the 2nd, 3rd and 4th digits are distinctly impressed. All natural size. From Coal Measures. Joggins, N.S. See p. 98.
- Fig. 2. *Nanopus quadratus*, n. sp. *a*. Left hind foot; *b*. Left fore foot. Both natural size. The impressed lobe on the inside of the sole is in the position of the fifth digit; the outside of the sole of the fore foot is faintly impressed. From Coal Measures. Joggins, N.S. See p. 98.
- Fig. 3. *Baropezia Sydneensis*. Dawson, sp. *a*. Mould of the left hind foot; *b*. Mould of the left fore foot. Both natural size. It is supposed that in the fore foot the second, third and fourth digits are present; compare with figures 1*d* of this plate. From Coal Measures. Sydney, N.S. See p. 100.
- Fig. 4. *Baropezia abscissa*, n. sp. *a*. Mould of the right hind foot; *b*. Mould of the left fore foot. Both natural size. It is supposed that the second, third, fourth and fifth digits are represented in this footprint. From Coal Measures. Joggins, N.S. See p. 101.

PLATE VI.*

- Fig. 1. *Hylopus Logani*, Dawson. A series of footprints on soft mud in which the toes dragged. Reduced $\frac{1}{3}$. If both rows of footmarks belong to one track it is unique, the toes shortening progressively outward; hence one may suspect that they belong to two different tracks, of which only one side in each case is shown. Lower Carboniferous. Horton, N.S. See p. 85.
- Fig. 2. *Hylopus Hardingi*, Dawson. Mould of a series of footprints reduced $\frac{1}{3}$. The print of the fore foot is close to, and in front of the hind foot. Lower Carboniferous. Parrsboro, N.S. See p. 83.
- Fig. 3. *Asperipes flexilis*, n. sp. A series of footprints reduced $\frac{1}{3}$. It shows the inner digits of the hind foot folded in. The fore foot is recognizable by its three toes and long heel. From Coal Measures. Joggins, N.S. See p. 89.

* Through a misunderstanding the figures in this plate were reduced one-third in area, in all other cases the reduction or enlargement is by diameters.

- Fig. 4. *Asperipes flexilis*. Another example of a series of footprints; in this the toes are extended. Reduced $\frac{1}{3}$. From Coal Measures. Joggins, N.S. See p. 89.
- Fig. 5. *Asperipes caudifer*, Dawson, sp. A series of footprints, curving in their course. Reduced $\frac{1}{3}$. A number of impressions of the hind foot are shown, and one of the fore foot; there is a broad median trail of the belly, and a narrower one of the tail. The waving dotted lines indicate the edges of the wave marks in the sand. From Coal Measures at Joggins, N.S. See p. 90.
- Fig. 6. *Megapezia Pineoi*, n. sp. A series of footprints showing four prints of the feet of the left side and a part of one of the right. Reduced $\frac{1}{3}$. The print with four toes is that of the hind foot, and that with five toes of the fore foot. The impressions of the fore feet are connected by dotted lines. From Lower Carboniferous. Parrsboro, N.S. See p. 103.

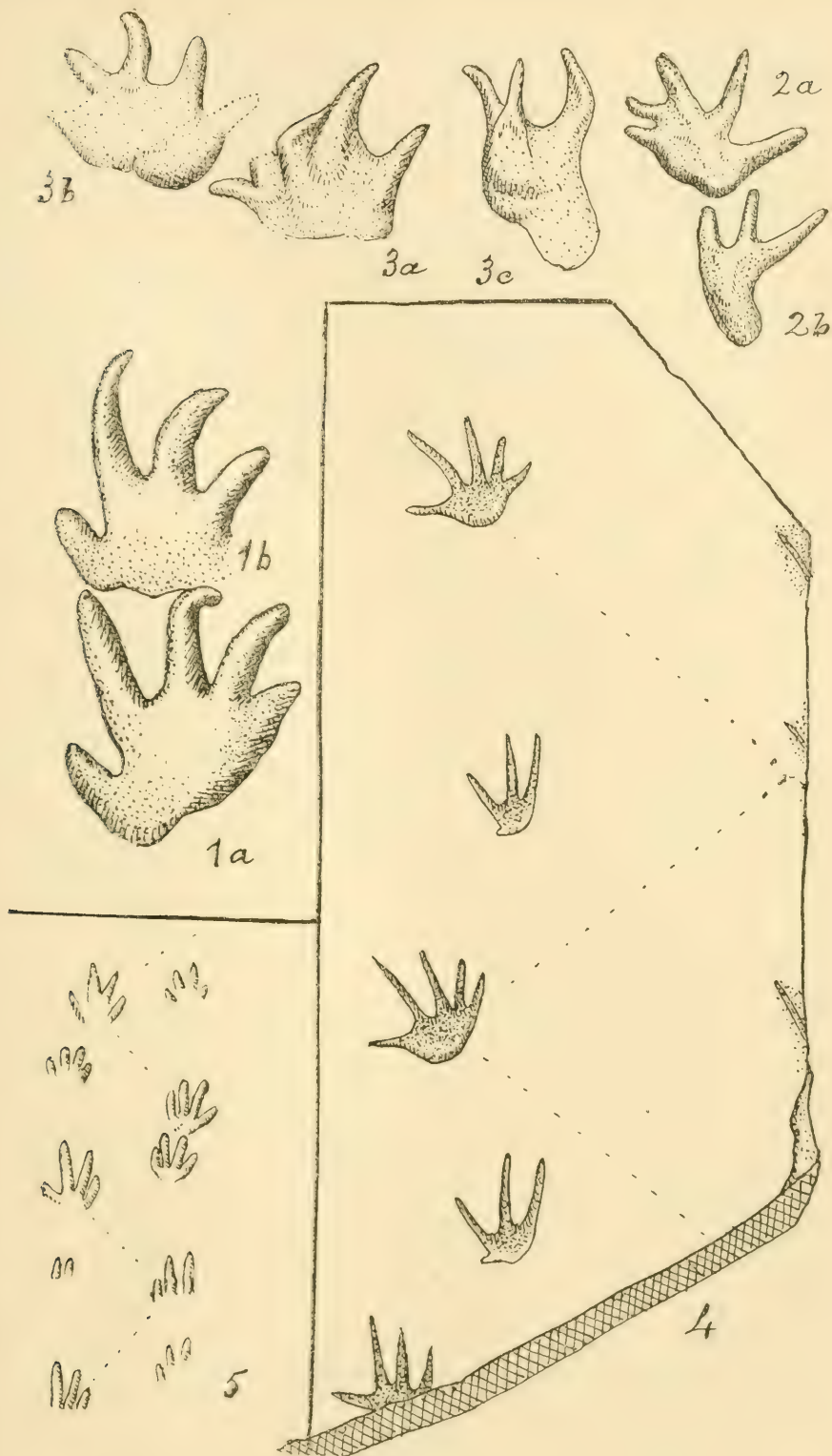


PLATE I.



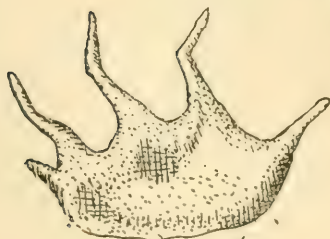
1b



2a



2b



1a



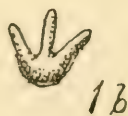
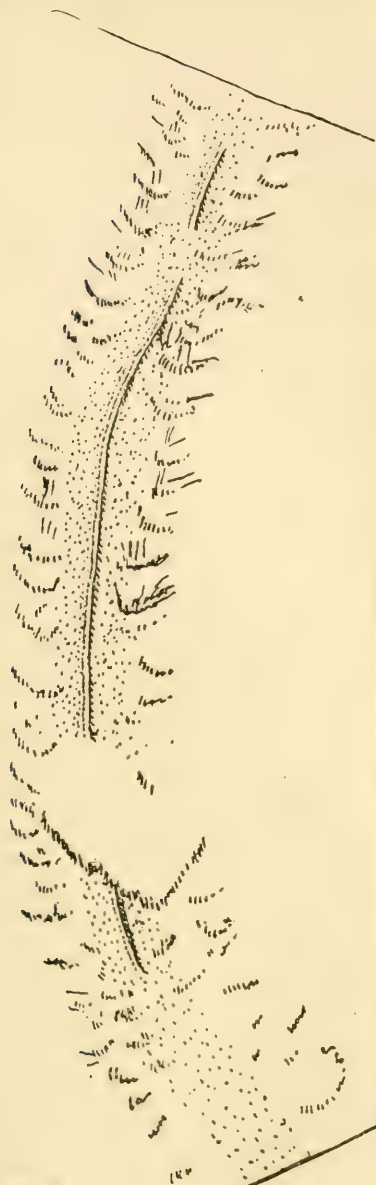
4b



4a



3



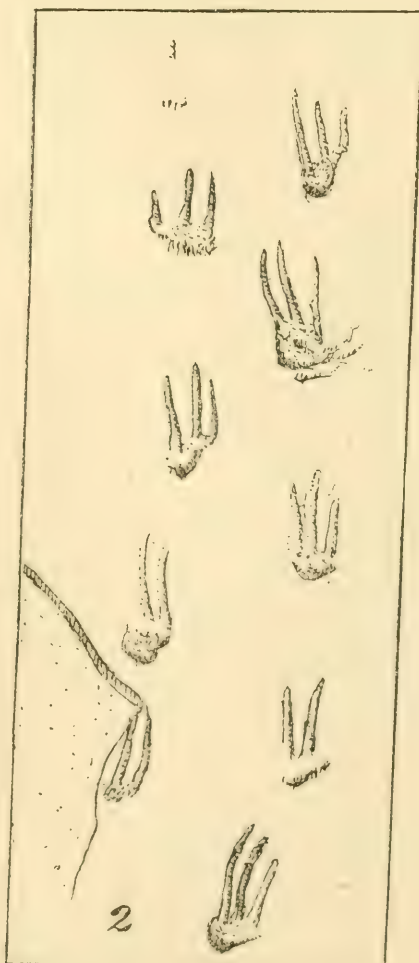
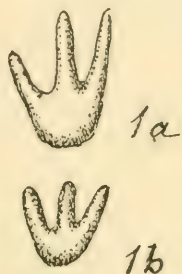


PLATE IV.

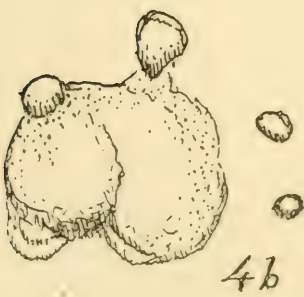
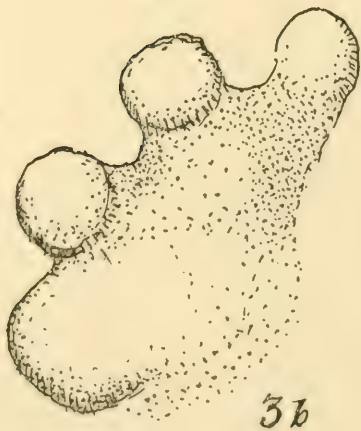
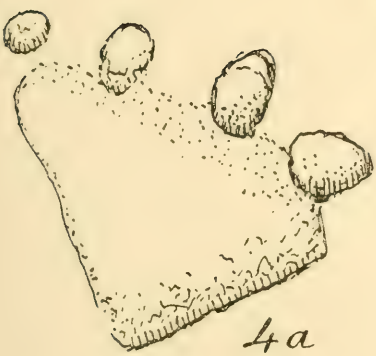
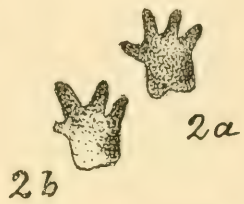
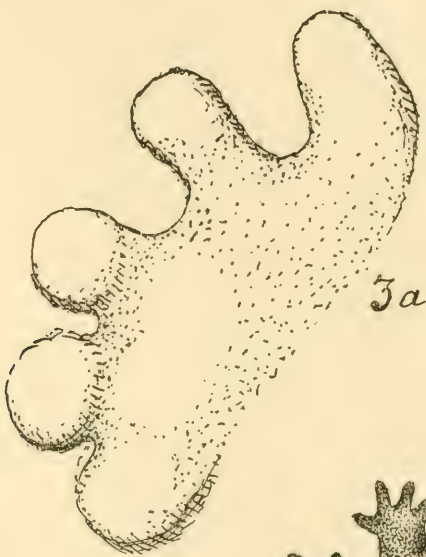
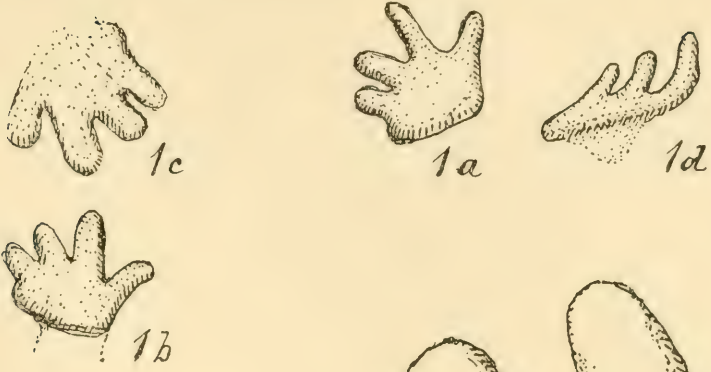


PLATE V.



V.—*The Volcanic Rocks of New Brunswick.*

By L. W. BAILEY, LL.D.

(Read June 22, 1904.)

In reviewing the features of the geological formations to be found in New Brunswick, an observer cannot but be struck by the frequency with which rocks of igneous or semi-igneous origin are brought to one's notice, as in the field he is equally surprised at the extent of the areas which they occupy. Being thus met with in systems of widely different age and with very unlike association, a wide field of comparative study is opened, upon which as yet but few observers have entered. It is for the purpose of stimulating inquiry in this direction, and possibly of affording some assistance in its prosecution, that the following paper has been written.

The geological column in New Brunswick embraces rocks referable to Pre-Cambrian, Cambrian, Ordovician, Silurian, Devonian, Lower Carboniferous, Carboniferous and Triassic horizons, and of these one only, viz., the Carboniferous or Coal Measures, lacks evidences of volcanic intrusions, while the Huronian of the Pre-Cambrian systems, the Silurian, the Lower Carboniferous and the Trias are those in which such evidences are most widespread and most conspicuous. In noting their varying characteristics and associations we may pursue an ascending order.

Laurentian.

The only rocks which upon definite evidence have been referred to this horizon are confined to the southern counties of St. John and Kings, where they consist for the most part of gneisses, quartzites and limestones, associated with granite and syenite. Though the latter are probably intrusive, and cover considerable tracks, they do not fall within the group which it is proposed to consider here. But quite apart from these the rocks of this system are found to be penetrated by innumerable dykes of what was evidently at one time melted rock, and the influence of whose fusion can be clearly seen in the alteration of the strata through which they passed. Admirable opportunities for the study of these dykes is to be found in the numerous quarries opened in the vicinity of the city of St. John for the removal of limestone, where the marked contrast of colour between the gray or sometimes nearly white limestone with the dark greenish gray or black colour of the effusive

masses at once attracts attention. Where the lime-rock, through the presence of disseminated graphite, is itself dark coloured, the course of the dyke is still made evident, as is also the metamorphic action of the escaping fluid, by the fact that for an inch or so on either side of the latter the rock is pure white, the graphite having been apparently completely burned away. Still another effect, well seen in some of the excavations on the hill sides overlying the village of Randolph, is the occurrence, near to and in parallel planes with the limestone, of conspicuous bands of coarse garnets and other minerals.

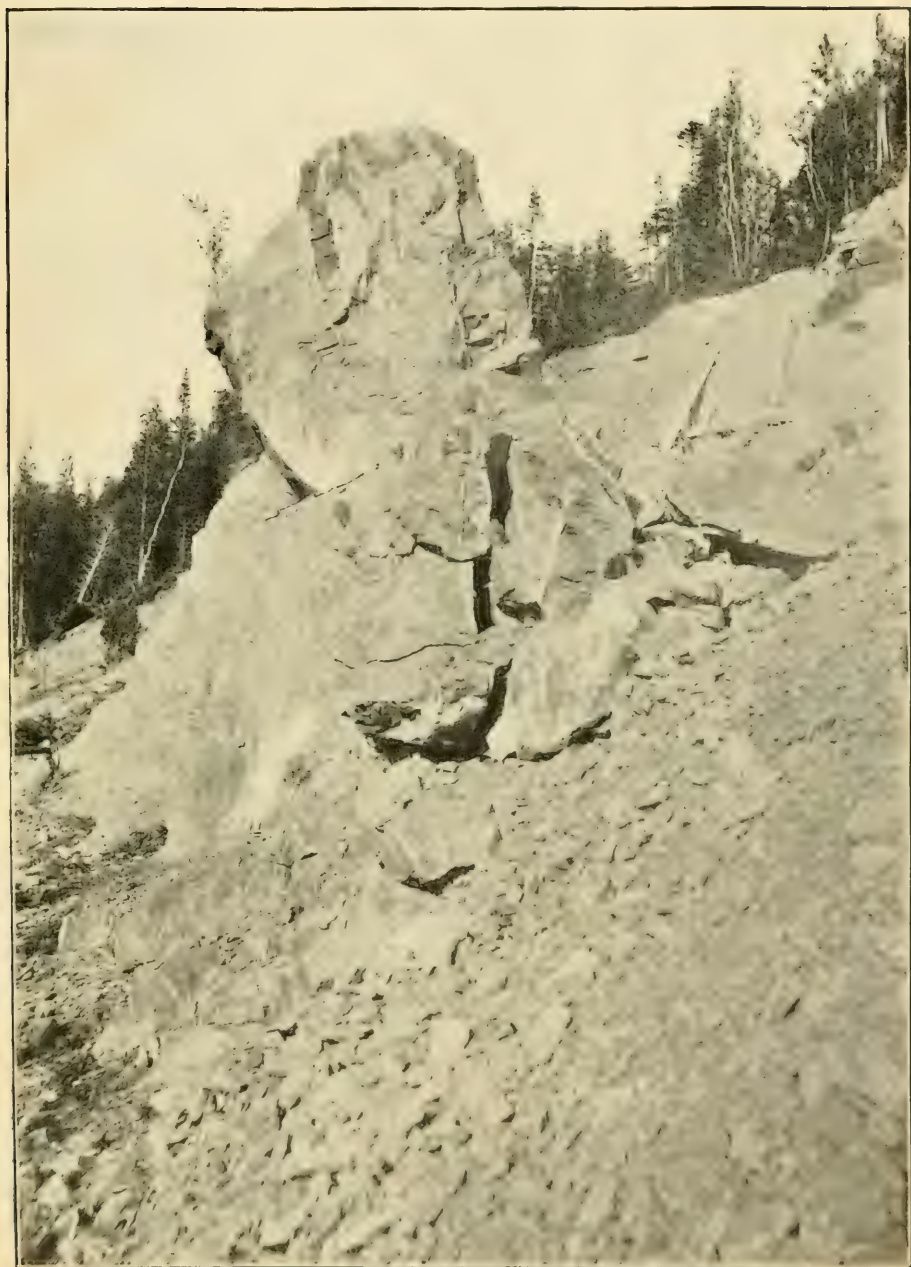
The dykes vary greatly in width as they do in frequency of association, as regards the former feature being sometimes only an inch or two wide and in other cases eight or ten feet, while as regards the latter they are sometimes few or isolated and at other times thickly clustered. Bifurcations of the dykes, and interruptions due to the previous jointing and dislocations of the beds are not uncommon. The usual attitude is one of steep inclination like that of the beds with which they are associated. These latter are most commonly limestones rather than slates or quartzites. Some of these features are well shown in the accompanying plate.

There can be but little doubt that the dykes referred to are of Post-Laurentian origin, and are or once were connected with the great surface flows which distinguish the next succeeding system. They may in general be described as diabases, though often much altered and usually finer grained and less distinctly crystalline than the rocks of this nature to be presently noticed in connection with later formations.

Huronian.

This system is above all others the volcanic system of New Brunswick, resembling in this respect the same system as found elsewhere. Indeed it contains little that is not more or less nearly the result of volcanic activities, and it was for this reason, together with its position between the supposed Laurentian rocks already referred to and the fossiliferous Cambrian strata about St. John, that as early as 1864 the claim was made by the writer and his colleague, Dr. G. F. Matthew, that the rocks in question were the representatives of the Huronian system as found on the shores of Lake Huron.

The areas covered by these volcanic products are large, including considerable tracts in St. John, Kings and Queens counties, where, owing to their power of resistance, the rocks usually form somewhat conspicuous hills. The latter also show considerable variety of composition and texture, including felsites of various colours and degrees of fineness, diorites both coarse and fine, ash rocks, amygdaloids, trachytes



DYKES IN LAURENTIAN LIMESTONE, ST. JOHN, N.B.

porphyries and breccias. The largest areas now exposed are a few miles east of St. John, in the neighbourhood of Loch Lomond and Hammond river, though others, hardly less conspicuous, are to be seen at some other points, notably near the Nerepis Hills. It would seem that during the period in question volcanic overflows, both areal and marine, characterized much of southern New Brunswick as they did much of the Atlantic sea-board of America, and that these conditions prevailed for a very considerable period, the thickness of the accumulations having been estimated (in St. John county) as not less than 10,000 feet.

Some years ago a collection of these supposed Huronian rocks of southern New Brunswick, made by the writer, were placed in the hands of Dr. W. F. Matthew, then of Columbia University, New York, and by him examined petrographically, with the result of finding that the Pre-Cambrian dykes of the district, whether in association with Laurentian or Huronian strata, were of the nature of diabases, while those of later origin appeared generally to be augite-porphyrite and basalt. The so-called felsites are usually fine grained admixtures of quartz and felspar, generally very flinty and hence in the earlier reports often designated as petrosilex, and not unfrequently porphyritic with minute crystals of orthoclase. The breccias or agglomerates are an especially noteworthy feature, indicating the rapid shattering, probably under water, of the lava-rock, and its subsequent recompacting into a mass so solid that only upon weathered surfaces or in microscopic sections can its true nature be recognized. The vesicles in the amygdaloids are sometimes filled with quartz, sometimes with calcite, and epidote and chlorite are of frequent occurrence, but zeolites, such as abound in the more recent eruptive rocks, appear to be wanting. Fluidal structures and "lines of flow" may sometimes be observed.

Cambrian.

The rocks referred to the Huronian in New Brunswick are followed up, and unconformably, by the Etcheminian group of Matthew, which, though yielding fossils, is regarded by that writer as also Pre-Cambrian. In it volcanic products continue to be a conspicuous feature, though these no longer predominate as compared with those of clastic origin. They seem to mark a gradual lessening of volcanic activities which in the true Cambrian almost disappear. Dykes it is true occur, but unless interbedded with the Cambrian strata it is not possible to assign these to a definite horizon, and some of them may be of much later origin. In his studies of these dykes, such as penetrate Cambrian slates at Barlow's Bluff, Dr. W. D. Matthew found them to consist of horn-

blende-basalt, felspathic diabase, augite-porphyrite and (though very doubtfully) a basic glass or Tachylite.

In western central New Brunswick a very interesting band of volcanic rocks is to be found in the western part of Carleton county, where it constitutes a well marked belt about twenty-five miles in length and two to three in breadth, stretching from the vicinity of Woodstock to Monument settlement near the boundary of Maine. Near Eel River it includes the somewhat prominent ridge known as Oak Mountain, and it is in this eminence and along the upper courses of Eel River that its most characteristic features are to be seen.

In their general aspect these rocks frequently suggest comparison with the "volcanics" of the Huronian, the occurrence of amygdaloidal ash rocks and of breccias, the latter only recognizable as such through the effects of weathering, being especially noticeable, but differ in being usually more distinctly basic, with fewer felsites or porphyrites and much iron and manganese. At some points the beds are markedly spherulitic. The associated slates are sometimes intensely red, and at others show a mottling of pale gray, red and purple colours such as are often found associated with the products of igneous action. They are here referred to in connection with the Cambrian system for the reason that they are closely associated with a series of black slates carrying remains of *Dictyonema sociale*, usually supposed to mark a Cambrian horizon, but the fact that they also closely adjoin strata carrying Silurian fossils, leaves the question of their true age still undetermined. Indeed, as will presently appear, the distinction of Huronian, Cambrian and Silurian volcanics has always been a source of much doubt and difficulty in working out the geology of New Brunswick.

Silurian.

Next to the Huronian no system in New Brunswick shows so marked an admixture of volcanic products, or so general a distribution of the latter, as the Silurian. They are to be found in all parts of the province, and in most instances form a conspicuous feature in the topography of the districts in which they occur.

Beginning in the southern counties the areas bordering and including Passamaquoddy Bay are especially noticeable for the evidences which they afford of Silurian vulcanism. For though ordinary aqueous sediments are abundantly displayed and abound in the characteristic fossils of the era, they are almost everywhere surmounted by rocks of igneous origin marking this region as one of pronounced volcanic activity in the Silurian era. Among the eminences thus constituted may be included the well known Chamecook Hills near St. Andrews, Troak's

Mountain and Mount Blair near St. George, portions of the Mascareen peninsula, McMaster's Island and, on the west side of the Bay, much of Moose Island on which rests the town of Eastport.

The rocks composing the hills referred to present the usual variety of volcanic ejecta, including diorites and gabbros, more or less amygdaloidal; but the most widely spread as well as the most conspicuous of these products is what has usually been termed felsite or porphyrite, but is in reality rhyolite, a rock usually of very fine grain, sub-translucent and varying from dark gray to chocolate in colour, often weathering to bright red, and having scattered through its mass numerous minute crystals of orthoclase. It is much jointed, the joints being often coated with crystalline epidote, and usually breaks with a broad conchoidal fracture, without much evidence of sedimentation; but in places stratification is clearly indicated by very regular colour bands, the corrugation of which by pressure has given to the rock, when polished, a resemblance to polished mahogany. Though for the most part resting upon the fossiliferous portion of the Silurian succession, the rhyolites are not only conformable to the latter but to some extent are interbedded, thus proving their Silurian origin. Were it not for these relations some of these highly felspathic rocks might well be mistaken for those of the Huronian system, and in visiting the region in 1873 in company with Dr. T. S. Hunt the latter could not be persuaded that they belonged to a more recent horizon until their actual superposition in nearly horizontal attitude was clearly shown.

The difficulty of readily distinguishing between the volcanic and semi-volcanic rocks of the Huronian and Silurian systems is again met where these two great systems come together in the valley of the St. John river in King's county, and in the Kingston peninsula, forming the southern side of Long Reach, a lake-like expansion of this river. It was not until the discovery of characteristic shells in what would seem at first to be mere ash-beds that the latter were referred to their true horizon.

And now, with these comparisons in view, we may pass to the consideration of another area the Silurian age of which has not until recently been even suspected. I refer to that portion of the Northern Highlands of the province in which are located the headwaters of the Tobique, Nepisiguit and other rivers, a mountainous tract of which the highest elevation, Mount Carleton, attains an elevation of 2,700 feet. In traversing this region, as did the writer as long ago as 1862, one is struck by the general prevalence of "felsites," so-called, especially on the upper Nepisiguit, blocks of such rock making up the greater part of the bed of the stream, while about the summits of the hills and occasionally at their base ledges of similar rock, made conspicuous by their

bright red weathering, constantly attract attention. It has been usual until recently to regard all these rocks as Pre-Cambrian, and they are so represented in the maps of the Geological Survey. But the reference was wholly based upon lithological grounds and those only of macroscopic characters, no superposition of undoubted Cambrian strata being here met with to show their anterior origin, and no petrographical examination of their nature being made. It is well therefore to look closely into these lithological features and resemblances, more especially as certain stratigraphical facts, recently observed, go far to suggest a much more recent origin for the beds in question.

In the first place then it may be observed that the term "felsites" very inadequately expresses the nature and variety of rocks to which it has been applied. On the contrary while, to the eye alone, some of the rocks in question are evidently mainly composed of felspar, and are granular crystalline and homogeneous through large masses, the prevailing rock is a rhyolite rather than a felsite, often porphyritic and in places amygdaloidal, while at times it presents the character of a breccia. While the more crystalline portions are sometimes and possibly are always of the nature of dykes, the more earthy varieties, including rhyolites and ash-rocks, alternate with ordinary sedimentaries, and at times show conspicuous bandings which would appear to be the result of aqueous deposition rather than of igneous flow or merely mechanical movements. In all these respects they bear a much closer resemblance, in the opinion of the writer, to the volcanic portion of the Upper Silurian, as found elsewhere in New Brunswick and Maine, than they do to the effusive rocks of the Pre-Cambrian systems already described. Indeed, placing representative series side by side, one not only notices the almost exact repetition in the Nepisiguit series of the Silurian "volcanics" as developed around Passamaquoddy Bay, even down to varietal differences, but is almost equally struck by the absence, both in the Nepisiguit and the Passamaquoddy areas, of some of the most conspicuous members of the typical Huronian rocks as developed about St. John. Thus nearly the whole of the Huronian rocks are remarkable for their highly silicious character, as indicated by the name of petrosilex under which they were originally described, and they are still often glassy in fracture and contents, while in the rocks of the Nepisiguit they are almost always devitrified.

Nor do the felsites of the northern counties exhibit anything like that variety of colours—pale pink, green, purple and salmon red or ribbanded—which are so noticeable in the south. Dark gray and reddish gray, weathering a bright brick red, is their prevailing hue, just as in the case of Chamcook hills and McMaster's Island. Like the latter they are porphyritic or amygdaloidal and in places marked by

conspicuous colour-bands indicating stratification at low angles. Finally they do not, as in the Huronian of St. John county, show any interbedding of felsites with felspathic sandstones, fine grained diorites or slaty dolomites. On the contrary the only rock with which the felsites of the upper Nepisiguit have been observed in contact, and that in the relation of being directly overlaid by the felsites as well as partly interstratified with them, is a coarse conglomerate, the aspect and composition of which is identical with that of beds of such rock forming a well marked member of the Silurian succession in Carleton county, New Brunswick, and Aroostook county, Maine. It would therefore seem that at the point at least where this observation was made by the writer only two years ago, viz., on the slopes of Mount Teneriffe on the Nepisiguit, the facts point much more strongly to the Silurian age of the volcanics in question than they do their Pre-Cambrian origin. Of other parts of the same region the evidence is not as yet so decisive, and probably some of the felsites there met with are intrusive dykes, but, from such observations as he has been able to make, the writer feels confident that large areas until recently regarded as Pre-Cambrian are really much more recent and that a general revision of the geological structure of the Northern Highlands will lead to very different views from those which have previously prevailed.

These conclusions, derived from personal observation in the field and from comparison of macroscopic characters, apparently receive confirmation from their petrographic or microscopic examination. Such examination, based upon a series of slides made from the Nepisiguit and Tobique rocks as collected in 1902 by the writer and Mr. R. A. A. Johnston, has been made by Mr. G. A. Young, of the Geological Survey, with the result of showing that the series contains rocks quite unlike those of the Pre-Cambrian system, and on the other hand quite remarkable for their comparatively recent aspect. Speaking of them as a whole, Mr. Young observes:

"The thin sections submitted for microscopical examination are all of volcanic rocks or their tuffs. The types of effusives represented include granophyre, quartz-porphry, devitrified rhyolite, andesite, porphyrite and basalt, with tuffs of quartz-porphry and porphyrite. While the rocks are always devitrified and usually more or less decomposed and altered, yet the structures typical of volcanic rocks and their glasses are frequently retained, such as banding and flow-structures, spherulites, perlitic cracks, lithophysies and drusy cavities."

As examples of more minute structure and as typical of the region in general, the descriptions of two slides may be added, the first from

Bald or Sagamook Mountain, the prominent eminence overlooking Nictor Lake at the head of the Tobique river, and the second about four miles to the southeastward, from the "Green range" of mountains, near the sources of the Nepisiguit.

Porphyry. Section 5765. Bald or Sagamook Mountain. "The thin section is composed of large and small phenocrysts of microcline, a number of orthoclase, many smaller lath-like individuals of acid plagioclase, feldspar, grains of magnetite and a few zircons lying in a microcrystalline ground.

The abundant feldspar phenocrysts are often bent or broken or otherwise show the effects of strain to which the microcline structure of some of them is probably due. The ground surrounding many of the phenocrysts and in spots throughout the section is exceedingly fine-grained and stained reddish. Very distinct spherulitic structures are common and usually have been developed around larger grains of the ground or a small grain of iron ore or zircon. Much of the ground is nearly cryptocrystalline in grain, but, where it is coarser, it is seen to be a granular aggregate of quartz and feldspar, the latter probably chiefly orthoclase. Green biotite occurs in small, irregular flakes through this ground.

The rock appears to be a rather acid variety which, were it not for the absence of quartz-phenocrysts, would be classed as a quartz-porphyry.

Section 5760. Green Range. Nepisiguit river. Porphyrite Tuff.

The thin section is composed of a very fine-grained, nearly cryptocrystalline ground in which lie a number of feldspar individuals and large and small, irregular or angular fragments of at least two varieties of volcanic rock.

The individuals of feldspar are of both orthoclase and plagioclase feldspar, and usually have rectangular outlines. Several of the plagioclase grains have been fractured and their component parts slightly separated, showing that the rock has been subjected to strain.

The more noticeable of the rock fragments are very dark from some pigment, and consist chiefly of small lath-like feldspars, probably plagioclase. The more abundant variety of rock fragments occurs in forms greatly varying in size and shape. They are generally of a light yellow colour and often contain much chlorite. Between crossed nicols they are seen to be composed of a fine grained granular aggregate apparently chiefly of feldspars. The grain of this latter variety varies somewhat, but is always considerably coarser than that of the ground."

One other area of undoubted Silurian rocks requires notice as being marked by the evidences of volcanic activity. This is the vicinity of the Baie des Chaleurs. Here rocks of igneous origin are met with in

almost every direction, helping to form the picturesque and varied landscape for which the region is so famous. They have been somewhat fully described and delineated by Dr. Ellis in the reports of the Geological Survey, wherein it has been also shown that many of them are of Post-Silurian origin, cutting and altering fossiliferous Silurian beds in the form of felsitic and doleritic dykes, and in some instances penetrating Devonian beds as well, but not those of Lower Carboniferous age. Some, however, would seem to be interbedded with the Silurian rocks and of contemporaneous origin. The writer has had no opportunity of giving them careful study, and is therefore not in a position to compare them with similar rocks found elsewhere, and still less to point out distinctions, if any, between those referable to the Silurian and those which more properly belong to the Devonian or later ages. He may, however, note, as a feature of contrast with the Pre-Carboniferous volcanics described above, and as suggesting closer similarity with the Lower Carboniferous and Triassic traps, the occurrence of quartzose and zeolitic minerals, agates, amethysts, jaspers, thomsonite and heulandite being frequently met with.

Lower Carboniferous.

The Lower Carboniferous is another formation remarkable for the extent of its volcanic activities, the evidences of the latter being widely spread and of great variety. They also occur at different horizons, though most common and most marked at or near the close of the era. Indeed the line of separation between the Lower Carboniferous and Millstone Grit—often a line of distinct though not great unconformity—is very generally marked by the occurrence of lava flows or volcanic ejecta. This is the case near Fredericton and Harvey, York Co., on the Miramichi above Boiestown; in the south Oromocto country; near Long Island in Queen's county; and on Newcastle Creek and about Grand Lake in the same county. Such rocks are also found on the Bay of Fundy coast near Quaco Head. As these localities present some very characteristic differences, they may be considered separately.

Of the occurrences referred to one of the most typical is that of a small eminence, five miles above Fredericton, known as Currie's Mountain. It is mainly interesting as showing so clearly the contrasts between the central and peripheral portions of the volcanic outflows, and the relations of both to the associated sedimentaries. Thus the central portion, making the hill proper, is a very compact hard fine grained black basalt, minutely but distinctly crystalline, with broad conchoidal fracture, without vesicles, and in places showing a marked tendency to develop columnar structures; and this material is alone visible from base to

summit of the eminence, though not far from its base and at various levels on the slopes of closely adjacent hills are numerous exposures of coarse bright red sandstones and conglomerates. Thus it would seem to represent a pipe or chimney penetrating the Lower Carboniferous formation, the beds of which are partly altered by its extrusion. On the other hand, near the summit of these same bordering hills, the red sediments in question, lying horizontally, are covered, also horizontally, by extensive sheets of what may best be described as a trap-ash, while over both are the coarse gray grits and conglomerates of the Coal measures.

The ash-rocks are generally and sometimes coarsely vesicular or amygdaloidal, the most common filling of the cavities being calcite and quartz, sometimes in large crystals, accompanied not unfrequently by chlorite or its variety delessite. Vertical cylindrical or serpentine tubes filled with white calcite and bordered by delessite, are sometimes met with. Epidote, if occurring at all, is rare. Zeolites also, with the exception of a little red heulandite, are mostly wanting. Pseudomorphs and incrustations of quartz on calcite are frequently met with.

From the entire absence of any material similar to the above in the basal beds of the Millstone Grit which rest directly upon the sheets of amygdaloid and ash rocks, it is evident that the spread of the latter antedated the period last named, and was a closing episode of the Lower Carboniferous era, a fact which would appear to be of general application.

On the Royal Road, several miles back from Currie's Mountain, a similar relation of beds to those of this eminence may be seen, but the want of exposures between makes it impossible to connect them as parts of a single outburst.

Another locality, closely paralleling that of Currie's Mountain, except that no central pipe is observable, is to be seen on the S. W. Miramichi river, about five miles above Boiestown. Soft bright red sandstones of the Lower Carboniferous formation, in nearly flat beds, are directly covered by about forty feet of gray vesicular ash rocks, with blocks of white felspar, distinctly bedded, and overlaid by gray grits and conglomerates filled with white quartz pebbles.

Similarly, upon the south side of the great central basin, relations in every way parallel to the above occur in Clon's settlement in Queen's county.

Finally, near the centre of the basin, on the Newcastle river, in Queens county, and not far from the coal workings at Grand Lake, the gray Carboniferous rocks, filled as usual with white quartz pebbles, may be seen (at Newcastle Forks) to rest upon sheets of gray amygdal-

loidal dolerite rock, which in turn repose upon bright red calcareous conglomerates of the Lower Carboniferous, all dipping at low angles. The seams and cracks of the trappean beds at this place are filled with bright red crystalline heulandite. A second type of volcanic accumulations is often to be found connected with the basal beds of the formation. This consists mainly of claystones and quartz-porphyrries, which are usually of light colour, and have the characteristics of volcanic muds and ash deposits, more or less mingled with ordinary clastic materials, rather than of pure lava flows. They cover considerable areas, one or two of which may be taken as typical.

Perhaps the most remarkable example is that of Harvey, York county, where a considerable eminence, known as Cranberry Hill, shows at its base, laid bare by excavations on the line of the C. P. R., a very complete and interesting section. This will be found fully described, with measurements, in the Report of Progress of the Geological Survey for 1872-73, p. 184. The most distinctive feature is the alternation of purplish feldspathic sandstones with coarse conglomerates or breccias, in which angular fragments of fine red felsite are imbedded in a paste consisting largely of a soft green mineral resembling serpentine, but which, as analyzed by Dr. Harrington, was found to be more nearly related to pyrophyllite. In the same district, but not forming a part of the Cranberry Hill section, are quartz porphyries, claystones, sometimes showing tube-like cavities containing calcite or zeolites, and fine sandy or muddy deposits filled with numerous and abrupt corrugations, which may be lines of flow. At Lister's Mills, five miles south-west of Harvey, where felsite breccias are again exposed, these contain veins of purple and green fluorite, both well crystallized.

A second locality, in which somewhat similar deposits occur, is that of the west shore of the St. John river, opposite Long Island, in Queens county. Here, as in many other places, as described above, the basal beds of the Coal Measures may be seen to rest upon beds of basic eruptives, such as dolerite or diabase, which are more or less amygdaloidal and contain zeolitic infiltrations; but beneath these are heavy beds of claystones, claystone porphyries, and rhyolites, somewhat variously coloured and intermingled with sandstones and shales. The section also includes beds of gray and reddish limestone, holding remains of brachiopods and orthocerata, which, by the action of the associated eruptives has been changed into an imperfectly crystalline marble.

Upon the southern coast the most noteworthy exposures of volcanic rocks in connection with Lower Carboniferous strata are to be found in the neighbourhood of Quaco Head, where they are again associated with marine limestones and conglomerates. In no instance have they been observed to penetrate the overlying strata of the Millstone Grit.

At a number of points around the borders of the great central coal basin, and most conspicuously along the valley of Shin Creek, a branch of the South Oromocto river, are large masses, sometimes forming conspicuous hills, of quartz-porphyrtes, trachytes, etc., indicating extensive igneous outflows, but of which the exact age is uncertain. Their relations to the great bands of argillites which inclose the Carboniferous basin would indicate that they are newer than the latter, but the further fact that they have largely contributed to the formation of the Lower Carboniferous conglomerates shows that their production antedated the latter. They may be either Silurian or Devonian.

So in northern New Brunswick, along the valleys of the Beccaguimic, Tobique and Serpentine, large tracts of felsitic rocks occur, as to the age of which little is definitely known. In the case of the Tobique, where they form the bulk of the so-called Blue Mts., a conspicuous feature in the scenery of that stream, they have been assigned partly to a Pre-Cambrian and partly to a lower Carboniferous horizon, but from such observations as the writer has been able to make are quite as likely, with the very similar beds of the upper Nepisiguit, already discussed, to be Silurian. Those found on the Beccaguimic and the Serpentine are, in his opinion, only peripheral form of granitic extrusion. Much more work, both in the field and with the microscope, must yet be made, before either the true age or character of these widespread eruptions will be accurately known.

TRIASSIC.

The last geological formation in New Brunswick which is noticeable as giving evidence of volcanic activity is the Trias or Trias-Jura. On the mainland it is but slightly represented by a few small and isolated areas upon the southern coast, but, taken in connection with the similar rocks so strikingly exhibited upon the opposite shore of the Bay of Fundy, and again at the mouth of the latter, in the island of Grand Manan, they point to a period and phase of vulcanism, which is of the highest interest.

In Grand Manan, a portion of the territory of New Brunswick, the volcanic rocks constitute fully two-thirds of the whole island, extending its whole length, with a breadth varying from two to five miles. At the northern end of the island is revealed an admirable natural section, the successive accumulations of volcanic material being superimposed upon each other in such a way as to form a series of conspicuous sheets, locally known as the "six days of creation." A closer examination shows these to be in part composed of a distinctly

crystalline rock, consisting mainly of an admixture of augite and plagioclase, with some magnetite and occasionally native copper, and in part of a more earthy granular material, variously coloured, which is more or less amygdaloidal, and in places carrying zeolitic minerals, such as Thompsonite. In all respects these rocks show the closest resemblance to those of the North Mountains of Nova Scotia, and are, no doubt, connected with the latter by submerged ridges lying along the bottom of the Bay of Fundy trough. There is nothing at Grand Manan to indicate their age, except that they overlie, as in the Annapolis valley, Triassic red sandstones, but probably, as is certainly the case in the valley last named, their ejection was not wholly subsequent to the Red sandstone era.

SUMMARY.

Summing up the foregoing observations we may note:

(1) That the great periods of volcanic activity in the history of New Brunswick were four in number, viz.: the Huronian, the Silurian, the Lower Carboniferous and the Trias.

(2) That the volcanic rocks of the Huronian, so far as known, are confined to the southern counties, not occurring at distances of more than thirty miles from the modern coast. The Silurian volcanics on the other hand cover large areas in northern and central, as well as in southern New Brunswick, being the most widely distributed of all the formations represented.

(3) That the Lower Carboniferous volcanic rocks are confined to areas, such as the great central basin and the Bay of Fundy trough, which had been produced by the great series of plications or earth-movements which marked the close of the Devonian age.

(4) That no volcanic disturbance affected the mainland of New Brunswick subsequent to the close of the Lower Carboniferous, the later ejections of the Jura-Trias being confined to the still subsiding trough of the Bay of Fundy.

(5) That the most abundant and typical volcanic rocks of the Pre-Cambrian (Huronian) system are diorites and diabases, those of the Silurian felsitic and porphyritic rhyolites, those of the Lower Carboniferous dolerites, and those of the Trias. basalts or augite-plagioclases. With the three former are associated felsites, porphyries and breccias, variously coloured, which are wanting with the last. Amygdaloids occur with all, but zeolites are rare in the more ancient volcanics. The earliest igneous rocks (Huronian) are about equally divided between the basic and acidic types; the latter predominate in the Silurian, and the former in the Trias.

(6) Lastly, the distribution of eruptive rocks is such as to indicate their correspondence with well-marked physical features of the present surface, and no doubt shared in the determination of the latter. Passamaquoddy Bay, the Baie des Chaleurs, the great central basin and the Bay of Fundy are all clearly outlined by the volcanic hills which border them.

VI.—*The Study of Canadian Fungi: A Review.*

By G. U. HAY, D.Sc.

(Read June 23, 1904.)

The study and distribution of fungi, especially of the Basidiomycetes, or higher fungi, has received so little attention on the part of Canadian botanists that a brief paper calling attention to the desirability of a more intimate knowledge of this class of plants, with a review of what has been already accomplished in this direction, may not be inappropriate at the present time. There are several workers in various parts of the Dominion who are devoting some attention to the fungi, but they are for the most part unknown to each other, except from correspondence or from an exchange of their all too brief and sporadic lists. In the full and excellent lists of the Dominion Natural History Survey, compiled by Professor Macoun and his assistants, the students of our flora have access to detailed information concerning the distribution of the known plants of Canada with the exception of the fungi and algæ.

In a recent letter from Professor Macoun, he states that he will, if spared, in two years from this time, begin the work of listing the large collections of fungi which he has gathered from different parts of the country. The completion of such a preliminary list will be looked forward to with much interest.

There will then remain only the great division of the algæ to be dealt with. The work on these in Canada has been even more meagre than on the fungi. Professor Farlow of Harvard University, in his work on the New England Marine Algæ, enumerates and describes a number of species found on the southern coast of New Brunswick. Professor Fowler, in the additions to his list of New Brunswick Plants, published a short list of marine algæ.¹ A paper was presented to this Section in 1887 by the writer containing a preliminary list, compiled by Dr. A. H. MacKay and himself, of nearly one hundred species of marine algæ known to exist along the seaboard of Nova Scotia, New Brunswick and Prince Edward Island.² No attempt, so far as I am aware, has been made to catalogue the marine flora of the Canadian

¹ Additions to List of New Brunswick Plants, by James Fowler, M.A. Report of the Secretary of Agriculture for New Brunswick, 1880.

² Marine Algæ of New Brunswick, by G. U. Hay. Introductory List of Marine Algæ of Atlantic Canada, with notes, by G. U. Hay and A. H. MacKay. From the Transactions of the Royal Society of Canada, 1887, pages 167-174.

Pacific coast, which must be wonderfully rich and varied. No attempt has been made to prepare any systematic list of our fresh water algæ.

The economic importance of these two unlisted divisions of our flora is very considerable. Our marine algæ contain a few plants useful for food; some have a value for manufacturing purposes, and some have fertilizing properties. Among the so-called higher fungi are many plants, which, if they have not the substantial food qualities sometimes attributed to them, are at least wholesome delicacies, palatable as well as nutritious,—much more so picked and eaten fresh than when imported from abroad. There are many forms in addition to our common mushroom (*Agaricus campestris*) which are equal if not superior to it in flavour and quality. Now that we have fairly entered upon a study of the distribution of our flowering plants and ferns, we should turn our attention to the fungi.

Apart from economic considerations, there are others which should influence scientific students,—and one is to make known to the world what is found in Canada. The investigation of our flora will help to solve problems of plant distribution and other problems of scientific interest to the world.

The distrust and suspicion with which many of the fungi are looked upon show that more attention should be given to them, to educate popular opinion in favour of a class of plants that have been much abused and maligned. The presence of vast numbers of toadstools of every form and colour in our woods and fields every year, especially in September and October, is a source of curiosity to those people who kick them over and desire of you the information whether such and such a plant is a "mushroom" or a "toadstool." Some there may be who, naturally observant, have found in the despised toadstool a beautiful and complicated structure. They recognize among the higher fungi an agaric by its gills, a polyporus or boletus by its pores, a hydnum by its spines, a morel by the fluted folds of its cap, or a puff-ball by its spherical or balloon-like shape. But you may count on the fingers of one hand probably those in Canada, outside of the Natural History Survey, who have attempted the serious study of the higher fungi, while still fewer have attempted the "Imperfect Fungi," as they are termed, which are so destructive as parasites on cultivated plants.

It is perhaps too soon to expect, in the multitude of problems which have occupied the attention of the botanists of the Dominion that much time should be devoted to the fungi; but their importance from an economic standpoint is great, and some general and systematic scheme for their investigation should be devised and put into practice.

Is there not room for that offspring of the Royal Society—the Botanical Club of Canada—to do some effective work in this direction? Its branches in each province might organize sections to study the distribution of flowering plants and the various divisions of non-flowering plants: a fern chapter; a section for the study of mosses and lichens; another for fungi; another for algæ. And along with the study of plants and their distribution might be combined the many fascinating problems of ecology, which would give a strong impetus to research work and a new life to the Botanical Club of Canada.

In the United States the study of the higher fungi has been vigorously prosecuted in recent years. Many books dealing with the subject have been published, all of them attractively illustrated, and many of them useful; government reports have been circulated; pamphlets and magazine articles by specialists have popularized the study—all designed to make better known the edible and poisonous mushrooms. As a result many persons have become interested, and mycological clubs in various sections have been formed to gather, study, test and place on exhibition in horticultural halls and other places these curious and little known plants, and to dissipate some of the errors and local prejudices concerning them. Much work of this kind could be done by amateur botanists throughout Canada, so that when the time comes for the publication of Professor Macoun's report, that veteran leader may find local lists and collections from different sections to assist him.

But local lists, in which the plants named have not been examined by specialists are of little value. Many genera, such as *Amanita*, *Russula*, *Clitocybe*, and others contain species so nearly alike that only a careful study of fresh specimens by the few specialists that this continent affords makes identification sure.

The following review of the work already done in collecting and listing fungi in localities in Canada is incomplete, but may serve to indicate what has been attempted. I shall be glad to receive any information from members of this Section concerning other published lists so that this record may be as complete as possible. The only guarantee of the correctness of a list must be that either the author has an intimate knowledge of the plants which he claims to have found and named, or that, before publishing, he has submitted all that may be regarded as critical species to a specialist for examination.

The earliest list of fungi of which I have any record is that published by Mr. D. A. Watt of Montreal, in 1865, in his *Catalogue of Canadian Cryptogams*.¹ "This list of fungi," says the editor, "is very im-

¹ A Provisional Catalogue of Canadian Cryptogams, by D. A. Watt. *The Canadian Naturalist*, 1865, Vol. II (New Series), pages 390-404.

perfect and is capable of indefinite extension. It comprises the collections of Dr. W. P. MacLaggan, whose species were determined by Rev. J. M. Berkeley, and those of the Editor, most of whose passed under the eye of Rev. Dr. Curtis of North Carolina." Both collectors confined themselves chiefly to microscopic forms.

One of the earliest lists published in the Maritime Provinces is that by Dr. Somers of Halifax, in 1880,¹ containing the names of thirty-three species, nearly all of which are Hymenomycetes.

In his "Additions to the Catalogue of New Brunswick Plants," published in 1880,² Rev. Professor Fowler records a list of fifty-three fungi, chiefly parasitic and saprophytic species. In an introductory note Professor Fowler states that his list is limited to species which have come under his own observation.

Of the existence of early lists in the other provinces of Canada I have no account.

Dr. A. H. MacKay, Halifax, has a list of Fungi in press in which he has consolidated Dr. Somers' observations with his own and several workers in Nova Scotia.³

Mr. John Dearness of London, Ontario, has undertaken a study of the "Imperfect Fungi" in his vicinity in conjunction with Mr. J. B. Ellis.⁴ Mr. Dearness has also devoted some attention to the higher fungi, but most of his results have been published in the United States. With this exception no serious attempt has been made to study the fungi of Ontario. Fungus-eaters there are in Ontario as well as the other provinces doing pioneer but necessary work in testing for edible varieties among the higher fungi.

The late Miss Van Horne and Miss Adaline Van Horne of Montreal, did some careful and interesting work in the Hymenomycetes about St. Andrews, N.B. A list of certain species found there was published by the Natural History of New Brunswick, jointly with a partial list collected at Ingleside, N.B., numbering in all sixty-seven species.⁵

¹ Nova Scotian Fungi, by J. Somers, M.D. Proceedings and Transactions of the Nova Scotian Institute of Natural Science, Vol. V, Part II, 1880.

² A Preliminary List of the Plants of New Brunswick, by Rev. James Fowler, M.A. Agricultural Report of New Brunswick for 1878. Additions to above, 1880.

³ This list has since been published (August, 1904), entitled: Fungi of Nova Scotia; a Provisional List, by A. H. MacKay, LL.D., F.R.S.C. From Proceedings and Transactions of the Nova Scotian Institute of Science, Vol. XI, Part I, pages 122-143.

⁴ New Species of Canadian Fungi (chiefly parasitic on the leaves of flowering plants), by J. B. Ellis and J. Dearness. *Canadian Record of Science*, Vol. V, 1892-3, pages 266-272.

⁵ A Preliminary List of New Brunswick Fungi, by G. U. Hay. Bulletin Natural History Society of New Brunswick, 1901, No. XIX, pages 341-344.

A second and more extended list was published by the Natural History Society of New Brunswick, in 1903, representing collections made by Mr. J. Vroom, St. Stephen; J. Moser, Havelock; R. R. Gates, Sackville; and G. U. Hay.¹ This list included 168 species and varieties, not before published in the province, chiefly Hymenomycetes, all of which, except a few common and unmistakable forms, were submitted in portions to well known specialists² The coniferous and mixed woods about Ingleside, Kings County, where most of the collecting was done, proved to be a very interesting place for the higher fungi. The region has yielded three varieties new to science,³ besides several rare and interesting forms chiefly of the genus *Hydnum*, which is so well represented there that fourteen species were identified.

The late summer and autumn of 1902 proved to be unusually prolific in fungi and there were many plants besides the 168 listed which had to be rejected owing to the impossibility of preserving them for identification before decay set in. This was especially the case with some fleshy agarics and Boleti, which decay very rapidly. Many of the plants sent to the specialists named above were not in a condition to be identified with any certainty. Of two plants of the genus *Boletinus* sent to Professor Peck, he says: "I believe both are undescribed species, but in the absence of definite and exact knowledge of the colours and characters of the fresh plant I think it will be well to wait the result of the coming season to see if more definite information cannot be gained of them before publishing."

Rev. Dr. Campbell of Montreal, has published a list of 129 species of fungi, chiefly Hymenomycetes, collected at Cap à l'Aigle, Quebec, and in the vicinity of Montreal.⁴

Professor John Macoun, Naturalist of the Dominion Natural History Survey, writes that he has collected, in the vicinity of Ottawa, 1100 species, with others from different parts of Canada. Of those

¹ New Brunswick Fungi, by G. U. Hay. Bulletin Natural History Society of New Brunswick, No. XXI, pages 109-119.

² Dr. W. G. Farlow of Cambridge, Mass., Professor Chas. H. Peck, State Botanist of New York, and Professor Atkinson of Cornell University.

³ *Cantharellus cibarius* Peck, var. *confertifolius* Peck n. var. *C. cibarius* Peck var. *plicatellus* Peck n. var. *Irpex fusco-violaceus* Fries var. *lenzioides* Peck n. var.

⁴ Canadian Fungi, by Robert Campbell, D.D., M.A. *Canadian Record of Science*, Vol. IX, No. 2, 1903. Dr. Campbell does not state whether or not mycologists, other than himself, have been concerned in the identification of the plants named in his list. It might be well for editors of lists to give such information, as it will tend to make their data more reliable in a study which is at best very recondite, and in which they are not aided as yet by any complete and reliable text-book of the fungi of this continent.

collected 225 species are agarics, which have all been determined by Professor Peck, and the others were submitted to specialists for identification.

The question that most concerns the public in the study and determination of the higher fungi is that of their edible and poisonous properties. Most of the *Amanitas* contain deadly poisons, and it is certain that other toadstools are more or less dangerous. But the great majority of toadstools are, no doubt, harmless. Many will be found to have certain food-qualities, although these are probably over-estimated by too enthusiastic fungus-eaters. There are certainly a few which may be considered as excellent table delicacies. I must confess that my own knowledge of edible species is too limited to permit me to speak with any authority. My experience in "tasting"—for obvious reasons—has been confined to a few species, but these I can recommend with some confidence.

Growing on the ground in the moss of coniferous woods in autumn is a little plant, related to the coral fungi. Its small size, from one to two inches high, would make it inconspicuous, except for the contrast made by its bright yellow stem pointing upwards like a small finger from its bed of green moss. This is a variety of the *Mitrula vitellina*. Unfortunately, like most of the fungi it has no common name. It is a helvella, and like others of that family has an excellent flavour and is perfectly harmless. Even with assurances of this sort from fungus-eaters, it was not without some doubts and after an earnest discussion, *en famille*, that it was decided to make a trial of this innocent looking plant. The result was most satisfactory. Its crispness and pleasant nut-like flavour, whether raw or cooked, make it a delicious accompaniment of salads, and it is decidedly palatable, even when eaten by itself raw. As this is a common species, easily recognized and perfectly safe, it is recommended to beginners.

Two other members of the *Helvella* family may be considered safe and very pleasant—the morel or *Morchella esculenta*, and the *Gyromitra esculenta*, the latter a very common species, found in abundance in May, along roadsides and under coniferous trees. There is a shade of suspicion attached to the latter plant in spite of the assurance of its specific name, *esculenta*, but I have recently eaten of it sparingly without any ill effects. It is decidedly pleasant to the taste.

Of the chantarelles, *Cantharellus cibarius* is common in deciduous and mixed woods and in grassy places. There is no doubt of its safety and its delicious flavour. Its vase-like cap and golden yellow, vein-like gills extending down the stem make it an attractive

object, and once recognized and its flavour, like apricots, tested, it will be always remembered.

The *Lactarius deliciosus*, although it belongs to a genus noted for acrid and peppery juices, is a safe and palatable mushroom. Its milky, reddish juice, turning to green on exposure, is a mark for the identification of this species. The "fairy rings" mushroom (*Marasmius oreades*) is very delicious, and may be dried for future use. The "Shaggy Mane" mushroom (*Coprinus comatus*) is excellent and usually very abundant. All of the above I can recommend.

These few species, with the common mushroom (*Agaricus campestris*), are plentiful in the Eastern Provinces, and will probably serve the wants of the mushroom-eater until his tastes demand a greater variety. But in this country where abundance of substantial food is not wanting, and when there are sufficient delicacies to tempt the moderately inclined, it is not well for any one to be rash in experimenting, especially when immunity from accidental poisoning can only be gained by a more exact knowledge. If any caution is necessary, it will be found in the cases of poisoning that have occurred in mistaking some of the forms of the deadly amanita for the common mushroom.

Perhaps, too, the botanist may find other recreation in the pursuit of this and other forms of plant-study which are greater than the pleasures of partaking of delicacies. There is the physical gain of taking one into the open air and finding wholesome pastime in the fields and woods. There is the example of Professor Macoun who, in his 74th year, is just starting for a summer's work in the Rocky Mountains. Still youthful, buoyant and hopeful in disposition, he is an instance of what such pursuits may do in preserving health and activity in spite of years. The illustrious Fries, of Sweden, writes as follows, when over eighty years of age: "Now in the evening of my life I rejoice to call to mind the abundant pleasures which my study of the more perfect fungi, sustained for more than half a century, has afforded me. . . . Therefore, to botanists, who can wander at will the country side, I commend the study of these plants as a perennial fountain of delight and admiration for that supreme wisdom which reigns over universal nature."

Nor are the intellectual gains unworthy of our ambition. The stimulus that comes from attacking fresh problems in the plant world gives greater zest to the study of botany.

VII.—*Bibliography of Canadian Entomology for the year 1903.*

Contributed by REV. C. J. S. BETHUNE, D.C.L.

(Read by title, June 21, 1904.)

ALDRICH, J. M.

Do we know *Culex consobrinus*, Desv? Canadian Entomologist, XXXV, 208-210 (July, 1903).

Reply by D. W. Coquillett, ib. 218 (August).

A rejoinder by Prof. Aldrich, ib. 264-5 (September).

ASHMEAD, W. H.

Classification of the Fossorial, Predaceous and Parasitic Wasps, or the Super-family Vespoidea. Canadian Entomologist, XXXV, 3-8 (January, 1903); ib. 39-44 (February); ib. 95-107 (April); ib. 155-158 (June); ib. 199-205 (July); ib. 303-310 (November); ib. 323-332 (December).

A new *Paranomia* from British Columbia (*P. Venablei*). Can. Ent., XXXV, 243 (September, 1903).

BALKWILL, J. A.

Report on insects of the year—33rd Annual Report, Ent. Soc. Ontario, 1902, pp. 41-42 (figures).

BANKS, NATHAN.

A revision of the Nearctic Chrysopidae (Describes several Canadian species). Trans. Am. Ent. Soc., XXIX, 137-162, plate, (April, 1903).

BEAULIEU, GERMAIN.

Les Scarabéides de la Province de Québec. Le Naturaliste Canadien, XXX, 10-13 (January), 1903. (Continué de la page 102, vol. XXVIII); ib. 38-42 (March); ib. 107-111 (July); ib. 125-128 (August); ib. 177 (December).

BETHUNE, C. J. S.

Editorial notes, Reviews, etc. Canadian Entomologist, XXXV, (1903); 33rd Annual Report Entomological Society of Ontario, 1902.

BEUTENMULLER, W.

Notes on some species of *Catocala*. (Describes a new variety *C. unijuga* var. *Fletcherii*, taken at Regina, Assa.). Bull. Am. Museum of Natural History, New York, XIX, pp. 505-510, Sept., 1903.

BIRD, HENRY,

New Histories in *Papaipema* (*Hydroecia*). (Describes the early stages of *H. appassionata*, which bores into the roots of the Pitcher plant, *Sarracenia*). Can. Ent., XXXV, 91-94 (April, 1903).

BRADLEY, J. CHESTER.

The genus *Platylabus*, Wesmael, with descriptions of two new species. (Gives a synopsis of the species with their synonymy and bibliography). *Can. Ent.*, XXXV, 275-283 (April, 1903).

BRUES, C. T.

A Monograph of the North American Phoridae (Includes many species found in Canada). *Trans. Am. Ent. Soc.*, XXIX, 331-404, plates V-IX (Oct.—Dec., 1903).

BUENO, J. R. DE LA TORRE.

Notes on the Stridulation and Habits of *Ranatra fusca*, Pal. B. *Can. Ent.* XXXV, 235-237 (August, 1903).

COCKERELL, T. D. A.

North American Bees of the genus *Nomada*. *Pro. Acad. Nat. Sci.*, Philadelphia, 580-614 (August). (Describes several species from Canada, including two new ones, *N. armatella* and *Bethunei*.)

COQUILLET, D. W.

Eucorethra, a genus of Culicidae. (Describes the new genus and species of Mosquito bred by Dr. Underwood, and also found in British Columbia). *Can. Ent.*, XXXV, 272 (Oct., 1903).

The genera of the Dipterous family Empididae, with notes and new species. (Contains a table of the genera, synonymy, etc., and includes the description of a new species, *Anthalia stigmatis*, from Port Renfrew, B.C.). *Pro. Ent. Soc.*, Washington, Vol. V, No. 4, pp. 245-272, 1903.

CRAWFORD, J. C., JR.

North American Bees of the genus *Agapostemon*, Guerin. *Proc. Nebraska Academy of Science*, VII, 156-165 (November, 1901). (Includes a new species, *A. borealis*, from Vancouver.

EVANS, JOHN D.

List of Canadian Coleoptera (taken in the North-west Territories by Prof. John Macoun). *Can. Ent.*, XXXV, 239-243 (September, 1903); ib. 288-292 (October); ib. 317-320 (November).

Report on Insects of the year. 33rd Annual Report Ent. Soc. Ont., 1902, pp. 38-39 (figures).

FERNALD, MRS. MARIA E.

A catalogue of the Coccidae of the world. (Includes a very full Bibliography and Synonymy). Hatch Experiment Station of the Massachusetts Agricultural College, Bulletin No. 88, pp. 360, Amherst, Mass.

Notes on Coccidae. (Discusses generic names and their order of priority). *Can. Ent.*, XXXV, 22 (January, 1903).

Lepidosaphes versus Mytilaspis, ib. XXXV, 90 (April).

FISHER, GEORGE E.

Report of Committee on the San José Scale. 34th An. Report Fruit Growers' Assoc. of Ont., pp. 69-74.

Report on Injurious Insects in 1902. 33rd An. Report Ent. Soc. Ont., 1902, pp. 15-20 (figures).

Report of the Inspector of San José Scale—Annual Report of the Ontario Department of Agriculture, 1902, Vol. ii, No. 21, pp. 24.

FLETCHER, JAMES.

Report of the Entomologist and Botanist—Experimental Farms Report, Ottawa, 1902, pp. 169-201 (plate and figures).

Note on *Deilephila galii*, Rott. Can. Ent. XXXV, 109 (April, 1903);

The Pea Weevil. 33rd Annual Report Ent. Soc., Ontario, 1902, pp. 3-8.

Insects injurious to Ontario Crops in 1902, ib. pp. 80-87 (figures).

Entomological Record, 1902, ib. pp. 87-98.

Insects injurious to Fruit. (Abstract of an address at Walkerton). 34th Annual Report of the Fruit Growers' Association of Ontario, pp. 54-55.

Farmers' Friends and Foes. (A Series of 49 articles, replies to enquiries respecting noxious and beneficial insects). Montreal Weekly Star, January to December, 1903.

The Pea Weevil. Montreal Weekly Star, March 25, 1903.

The Eyed Elater. Montreal Weekly Star, August 12, 1903.

The Carolina Praying Mantis. Montreal Weekly Star, October 14, 1903.

FILES, THOMAS W.

Cassida viridis, Linn. (Proofs of the identification of this Tortoise-beetle, recently introduced into Quebec). Can. Ent. XXXV, 23 (January, 1903).

The same article translated into French, with an Editorial note. Le Nat. Can., XXX, 22 (February).

Aradus luteolus, new species (taken at Quebec). Can. Ent., XXXV, 75-76 (February).

Quebec Diptera (a list of species not hitherto recorded in Canada). Can. Ent., XXXV, 234 (August, 1903).

Insect Life (Presidential Address). 33rd An. Report Ent. Soc. Ont., 1902, pp. 23-30 (figures).

The Paper-making Wasps of the Province of Quebec. 33rd An. Report Ent. Soc. Ont., 1902, pp. 69-74 (figures).

GIBSON, ARTHUR.

The life history of *Crocigrapha Normani*, Grote. Can. Ent., XXXV, 17-20 (January, 1903).

Notes on Canadian Species of the genus *Apantesis* (Arctia), with special reference to the larvæ. Can. Ent. XXXV, 111-123 (May, 1903); ib. plate, 143-154 (June). Twenty species are discussed.

Hunting for Caterpillars. Ottawa Naturalist, XVII, 77-80 (July, 1903).

Some interesting habits of Lepidopterous larvæ. 33rd Annual Report Ent. Soc. Ont., 1902, pp. 74-78 (figures).

Notes on *Semiophora Youngii*, Smith, ib. pp. 79-80.

GROTE, A. RADCLIFFE.

Some corrections to Dr. Dyar's List of Noctuids. Can. Ent., XXXV, 237-238 (August, 1903); ib. 257-260 (September).

HARRINGTON, W. HAGUE.

Arctic Siricoidea and Tenthredinoidea. Can. Ent., XXXV, 15-16 (January, 1903).

Male Wasp with Female Antennæ (*Thyreopus laticeps*, Smith). Can. Ent., XXXV, 37-38 (February, 1903)

Entomological Record—Hymenoptera and Diptera. 33rd Annual Report, Ent. Soc. Ont., 1902, pp. 99-101.

Notes on Insects injurious to Pines, ib. pp. 114-117 (figures).

HINDS, WARREN ELMER.

Contribution to a Monograph of the Insects of the Order Thysanoptera inhabiting North America. (Describes very fully several species found in Canada). Proc. U. S. National Museum, Washington, Vol. XXVI, pp. 79-242, plates I-XI (No. 1310).

HUARD, V. A.

Un cas de Parasitisme sur le peau humaine. (An account of the finding of a Tick, *Ixodes vicinus*, embedded in a patient's skin). Le Nat. Can., XXX, 157-162, November, 1903 (figures).

KEEN, J. H.

Ægialites debilis, Mann. (An account of the habits of this remarkable beetle taken by the writer on Queen Charlotte Islands and the opposite coast of British Columbia). Can. Ent., XXXV, 125-126 (May, 1903).

LENG, CHARLES W.

Notes on Coccinellidæ. (Gives synoptic tables and descriptions of a large number of Canadian species). Journal New York Ent. Soc., XI, 35-45, March, 1903 (plate); ib. pp. 193-213 (2 plates), December, 1903.

LOCHHEAD, W.

Fungous Diseases and Insect Pests of 1902. (Abstract of an address at Walkerton). 34th Annual Report of the Fruit Growers' Assoc. of Ont., pp. 62-63.

The Pea Weevil. 33rd Annual Report Ent. Soc. Ont., 1902, pp. 8-9; 13-15.

The Insects of the Season. 33rd An. Report Ent. Soc. Ont., 1902, pp. 64-69 (figures).

A key to Orchard Insects—ibid. pp. 101-114 (figures).

Some injurious Insects and Fungous Diseases of the year 1902. Report of the Ontario Agricultural College; Guelph, pp. 19-28 (figures).

Peas and the Pea Weevil. Ontario Agricultural College Bulletin 126, pp. 32 (figures).

The present condition of the San José Scale in Ontario. Ont. Agric. College Bulletin 133, pp. 8 (4 plates).

LYMAN, HENRY H.

Miscellaneous Entomological Notes. Can. Ent., XXXV, 339-341 (December, 1903).

A few notes on *Danais archippus*. 33rd An. Report Ent. Soc. Ont., 1902, pp. 61-63.

MOFFAT, J. ALSTON.

Notes on the season of 1902. 33rd An. Report Ent. Soc. Ont., 1902, pp. 58-60 (figures).

A talk about Entomology, *ibid*, pp. 117-123.

MORRILL, AUSTIN W.

Life history and description of the Strawberry Aleyrodes, *A. Packardi*, new species (with plate). Can. Ent., XXXV, 25-35 (February, 1903).

RICHARD, A. E.

Ottawa Satyrinae. (Records the capture of six species). Ottawa Naturalist, XVI, 234-236 (March, 1903).

ROBERTSON, CHARLES.

Synopsis of Nomadiniæ. Can. Ent., XXXV, 172-179 (June, 1903).

Synopsis of Epeoliniæ. Can. Ent., XXXV, 284-288 (October, 1903).

SANDERSON, E. DWIGHT.

The Larva and Pupa of the Apple Bud-borer, *Steganoptycha pyricolana*, Murt, with figures. Can. Ent., XXXV, 158-161 (June, 1903).

SMITH, JOHN B.

New Noctuids for 1903, No. 1. (Describes *Feralia Columbiana*, a new species from British Columbia and the North-west Territories). Can. Ent., XXXV, 9-14 (January, 1903).

New Noctuids for 1903, No. 2. (Includes the following new Canadian Species, *Moma geminata* from Cartwright, Man.; *Abagrotis ornatus* from Kaslo, B.C.; *Uretagrotis inattenta*, *Carneades focinus* and *Hadena Alberta*, from Calgary; *Nephelodes tertialis*, Winnipeg; *Cosmia venosa*, Victoria, B.C.). Journal New York Ent. Soc., XI, 1-23, plate (March, 1903).

New Noctuids for 1903, No. 3. (Describes a number of new species from Calgary, Alberta). Can. Ent., XXXV, 9-14, plate (May).

New Noctuids for 1903, No. 4. (Describes *Melicleptria Kasloa*, a new species from British Columbia). Trans. Am. Ent. Soc., Philada., XXIX, 191-224, plate (June).

New Noctuids for 1903, No. 5 (Includes *Euxoa nesilens* a new species from Brandon and Calgary). Journal New York Ent. Soc. XI, 188-193 (December, 1903).

A Revision of the Boreal American species of *Nonagria*, Ochs. (Includes the description of *N. subflava* Grote, a species recorded from Hamilton, Ont., Winnipeg and Cartwright, Manitoba). Pro. Ent. Soc., Washington, Vol. V, No. 4, pp. 311-321, 1903 (plate).

STEVENSON, CHARLES.

A new Capsid (described *Lygus Chagnoni* a new species taken in Rouville Co., and on the Island of Montreal, P. Que.). Can. Ent. XXXV, 214 (August, 1903).

Notes on the season of 1902, 33rd Am. Report Ent. Soc., Ont., 1902, pp. 57-58 (figures).

UNDERWOOD, W. LYMAN.

A new Mosquito. (Describes the larva and habits of *Eucorethra Underwoodi*, a new genus and species of Mosquito taken in British Columbia, as well as in Maine). Science, XVIII, No. 449, 182-184 (August, 7th, 1903).

WALKER, E. M.

The genus *Podisma* in Eastern North America (plate). Can. Ent. XXXV, 295-302 (Nov., 1903).

Report on insects of the year. 33rd An. Report Ent. Soc., Ont., 1902, pp. 39-41 (figures).

WICKHAM, H. F.

The North American Species of *Pedilophorus*. (Includes a new species, *P. Lecontei*, taken in British Columbia). Can. Ent. XXXV, 179-182 (June, 1903).

WILLIAMS, J. B.

Butterfly notes from Toronto for 1902. Can. Ent. XXXV, 187-188 (July, 1903).

YOUNG, C. H.

Report on insects of the year. 33rd An. Report Ent. Soc., Ont., 1902, pp. 37-38 (figures).

VIII.—*Bibliography of Canadian Botany for 1903.*

By A. H. MacKAY, LL.D.

(Read 24th June, 1904.)

ATWOOD, A. E.

"Nature Study, No. V," in *Ottawa Naturalist*, XVII, 7, pp. 113-116, Sept., 1903, Ottawa.

BRITAIN, JOHN.

"Nature Study—After Summer Vacation," in *Educational Review*, XVII, 2 and 3, pp. 38, 39, July and Aug., 1903, Saint John, N.B.

"Autumn Lessons—Trees and Shrubs," *Ed. Rev.*, XVII, 5, pp. 96, 97, Oct., 1903, Saint John, N.B.

CAMPBELL, D. A.

"Nature Study," in *Ottawa Nat.*, XVII, 3, pp. 61-64, June, 1903, Ottawa.

CAMPBELL, R. H.

"The Sumach," in *Rod and Gun*, V, 5, pp. 197, 198, Oct., 1903, Montreal.

CAMPBELL, ROBERT.

"A Sketch of the Progress of Botany in the Nineteenth Century," reprinted from *Canadian Record of Science*, IX, 1, pp. 39-53, Jan., 1903, Montreal.

"Canadian Fungi," reprint, *Can. Rec. Science*, IX, 2, pp. 89-99, July, 1903, Montreal.

CANADIAN FORESTRY ASSOCIATION

"Fourth Annual Report," with numerous references in papers and discussions to botanical facts involved in Forestry, 119 pages, 9.5 x 6.5 inches, 1903, Ottawa.

"The Bitternut," in *Rod and Gun in Canada*, IV, 8, pp. 299-302, Jan., 1903, Montreal.

"The Rocky Mountain Park," *Rod and Gun*, IV, 9, pp. 326-328, Feb., 1903.

"Reforestation," *Rod and Gun*, V, 1, pp. 22-24, June, 1903.

"The Bitternut Hickory," *Rod and Gun*, V, 1, pp. 24-30, June, 1903.

"The Mossy or Overcup Oak," *Rod and Gun*, V, 2, pp. 73-76, July, 1903.

"The Rock Elm," *Rod and Gun*, V, 3, p. 108, Aug., 1903, Montreal.

"The Art of Forestry," *Rod and Gun*, V, 3, pp. 116-117, Aug., 1903.

"The Fir," *Rod and Gun*, V, 4, pp. 163-166, Sept., 1903.

"The Foothills Timber Reserve," *Rod and Gun*, V, 5, pp. 209-210, Oct., 1903.

"Adirondack Forestry" (pp. 246-251), "Our Western Forests" (pp. 251-252).

"The Ironwood" (pp. 252), "Ontario Forest Policy" (pp. 253-254), in *Rod and Gun in Canada*, Vol. V, No. 6, Nov., 1903, Montreal.

CAVANAGH, MARIA.

"Just Outside the Garden of Eden"—Notes on the Botany of Pictou County, Nova Scotia, Educational Review, XVI, 8, pp. 165, 166, Jan., 1903, Saint John, N.B.

CLERKIN, JOHN T.

"Heath Blooms of Prince Edward Island," in Prince Edward Island Magazine, September, 1903, Charlottetown, P.E.I.

COLLINS, F. S.

"North American Ulvaceae" in Rhodora, V, 49, pp. 1-32, Jan., 1903, Cambridge, Mass., U.S.A.

CUMMING, MELLVILLE.

"The Story of Plant Roots," in Bulletin 124, Ontario Agricultural College, pp. 10-15, Dec., 1902, Guelph.

DEARNESS, JOHN.

"How to Distinguish the Maples," in London (Ontario) Advertiser, 2nd May, 1903.

"The Elm Pleurote Mushroom," reprinted from Farmer's Advocate, 15 Dec., 1903.

DIONNE, C. E.

"Les Fougere Du Canada," Le Naturaliste Canadien, XXX, 6, pp. 91, June, 1903, Quebec.

DOHERTY, MANNING W.

"Report of the Associate Professor of Biology," in 27th Annual Report of the Ontario Agricultural College, pp. 26-34; and in 28th Ann. Rep., pp. 27-32; 1902 and 1903 respectively, Guelph.

EMBERSON, F. C.

"The Trees of Montreal Island," in Canadian Record of Science, IX, 1, pp. 78-83, May, 1903, Montreal.

EVANS, ALEXANDER W.

"Yukon Hepaticae," in Ottawa Naturalist, XVII, 1, pp. 13-24, with two full page plates, April, 1903, Ottawa.

FERNALD, M. L.

"*Andromeda polifolia* and *A. glaucophylla*," in Rhodora, V, 50, pp. 67-72, Feb., 1903, Cambridge, Mass., U.S.A.

"*Linum catharticum*," in Cape Breton, in Rhodora, V, 52, April, 1903.

"(Some Varieties of "*Triglochin maritima*" Rhodora, V, 54, pp. 174, 175, June, 1903.

"*Chrysanthemum Leucanthemum*," Rhodora, V, 55, pp. 177-182, July, 1903.

"American Representatives of *Luzula vernalis*," Rhodora, V, 56, pp. 193-196, Aug., 1903.

"*Arabis Drummondii* and its Relatives," Rhodora, V, 57, pp. 225-231, Sept., 1903.

FLETCHER, JAMES.

"*Matricaria inodora* L," Ottawa Naturalist, XVII, 8, pp. 143-144, Nov., 1903, Ottawa.

FOSTER, M.

"The Identity of *Iris Hookeri* and the Asian *I. setosa*," Rhodora, V, 54, pp. 157-159, June, 1903, Cambridge, Mass., U.S.A.

"FREM" (DENMARK).

"Naturdagtagelser"—Remarks on the Danish school phenological observations in comparison with those of Nova Scotia, from which they developed, 5, April, 1903.

GAMBLE, W. P.

"The Story of Sugar," Bulletin 124, Ontario Agricultural College, pp. 58-64, Dec., 1902, Guelph.

GANONG, W. F.

"The Vegetation of the Bay of Fundy Salt and Diked Marshes; An Ecological Study" (Contributions to the Ecological Plant Geography of the Province of New Brunswick, No. 3). Reprinted from the Botanical Gazette (University of Chicago Press), XXXVI, Sept. to Dec., 1903, pp. 161-186, 280-302, 349-367, 429-455, with maps and photogravures.

"Notes on the Natural History and Physiography of New Brunswick," containing numerous Botanical observations. Article IV, in Bulletin, Natural History Society of New Brunswick, No. XXI, Vol. V, Pt. I, pp. 35-92, 1903, Saint John, N.B.

GUIGNARD, J. A.

"La Truffe—Découverte De La Germination Des Spores," in Le Naturaliste Canadien XXX, 12, pp. 169-172, Dec., 1903, Quebec.

HARCOURT, ROBERT.

"The Story of a Loaf of Bread," in Bulletin 124, Ontario Agricultural College, pp. 20-25, Dec., 1902, Guelph.

HARRISON, C. F.

"The Story of the Yeast Plant," in Bull. 124, Ont. Agr. Coll., pp. 26-29, Dec., 1902, Guelph.

Reports of the Professor of Bacteriology in the Annual Reports of the Ontario Agricultural College Guelph:

26th Ann. Rep. pp. 69-75, 1901.

27th " " " 74-81, 1902.

28th " " " 86-104, 1903.

HAY, GEO. U.

"New Brunswick Fungi," in Bulletin, Natural History Society of New Brunswick, No. XXI, Vol. V, Pt. 1, pp. 109-120, 1903, Saint John.

"New Brunswick Fungi," reprinted with changes from Bull. Nat. Hist. Soc., N.B., No. XXI, 12 pp., 1903, Saint John, N.B.

HERRIOT, W.

"Willows Collected at Galt," in Notes from Thicket and Swamp, 24th Dec., 1903, in Guelph (Ontario) Herald.

HILL, J. A.

"Resurrection Plant, *Lewisia rediviva*, Pursh," in Canadian Record of Science, IX, 2, pp. 111-112, Dec., 1903, Montreal.

HOLM, THEO.

"Biological Notes on Canadian Species of Viola," in Ottawa Naturalist, XVII, 9, pp. 149-160, Dec., 1903, Ottawa.

HUTT, H. L.

"The Story of an Apple," in Bull. 124, Ont. Agr. Coll., pp. 53-57, Dec., 1902, Guelph.

Reports of the Professor of Horticulture in the annual reports of the Ontario Agricultural College, Guelph:

26th Ann. Rep., pp. 61-68, 1901.

27th " " " 67-73, 1902.

28th " " " 77-85, 1903.

IHNE, E.

References to Canadian phenological publications in "Phaenologische Mitteilungen (Jahrgang, 1903), Sonder-Abdruck aus d. Abhandlungen d. Naturalist, Gesellsch, XV, Bd. H. 2, Nürnberg, p. 29.

JAMES, C. C.

"Teaching of Agriculture in our Public Schools," in Bull. 124, Ont. Agr. Coll., pp. 81-94, Dec., 1902, Guelph.

"A Talk to Teachers," with allusions to botanical teaching, *ibidem* pp. 94-96.

JOLY DE LOTBINIERE, E. G.

"The Black Walnut," in Rod and Gun, V, 7, pp. 396-397, Dec., 1903, Montreal.

KLUGH, A. B.

"The Caprifoliaceæ of Wellington County," Bulletin No. 1, Wellington Field Naturalists' Club, in Guelph Herald, 22nd July, 1903, Ontario.

"The Genus *Galium* in Wellington County," No. 2 *ibidem*, 26th Aug., 1903.

"The *Orchidaceæ* of Wellington County," No. 3 *ibidem* 1903.

"Some Parasitic Plants," in Notes from Thicket and Swamp, *ibidem*, 6th Nov., 1903.

"The Genus *Aster* in Wellington County," in Notes from Thicket and Swamp, *ibidem*, 6th Nov., 1903.

"The Fern Flora of Wellington County," a series in Notes from Thicket and Swamp in the Guelph (Ontario) Herald, from 20th Nov. to 24th Dec., 1903.

"The Orchids of Wellington County, Ontario," in American Botanist, Dec., 1903.

KNECHTEL, A.

"Estimating Timber Content (Ulrich's Method)," in Rod and Gun, IV, 10, pp. 370, 371, March, 1903, Montreal.

LE NATURALISTE CANADIEN.

"Un Mot Des Diatomées," Vol. XXX, No. 4, pp. 51-54, April, 1903, Quebec.

LOCHEAD, WILLIAM.

"Outlines of Nature Studies in the Biological Department of the Ontario Agricultural College," pp. 20, 1903, Guelph.

"The Weeds of Ontario," a revision of the "Weeds of Ontario" by F. C. Harrison in 1899, in Bull. Ont. Agr. Coll., pp. 1-96, with numerous figures, Aug., 1903, Toronto.

"Prickly Lettuce, and Broad-leaved Gum Plant," in Annual Report, Ontario Agricultural College, 1899, pp. 38-39, Guelph.

"Celery Blight, Tumble Weed, Pigeon Weed, Asparagus Rust," pp. 15-18 1900, *ibidem*.

"Grain Rusts, Black Rot of Grapes," pp. 20-25, 1901, *ibidem*.

"New Disease of Tobacco (*Macrosporium longipes*), the Leaf Spot of the Sugar Beet, the Leaf Spot of the House Chestnut, the Shot Hole Disease of Plum and Cherry, the Rot of Bean Pods affected with anthracnose, pp. 24-26, 1902, *ibidem*.

"Wild Barley, Rosin Plant, Bracted Plantain, the Egyptian Pea Blight, and two Blights of Potatoes," pp. 23, 24, *ibidem*.

Reports of the Professor of Biology and Geology, *ibidem*, pp. 11-21 of 1901; pp. 16-25 of 1902; and pp. 16-28 of 1903.

MACKAY, A. H.

"Phenological Observations, Canada, 1902," in Report of the Botanical Club of Canada, Transactions Royal Society of Canada, 1903 (2nd series, Vol. IX). Appendix D., pp. cxxi-cxxxviii, Ottawa.

"Botanical Bibliography of Canada, 1902," *ibidem* pp. 169-172.

"Phenological Stations and Observers, Nova Scotia, 1902-3, and Reports of the staff of Compilers," in Journal of Education, 3rd series, Vol. IV, No. 3, pp. 89-98, April, 1903, Halifax.

"Phenological Stations and Observers, Nova Scotia, 1902-3, and Report of one of the staff of Compilers," *ibidem*, Vol. IV, No. 4, pp. 126-137, Oct., 1903, Halifax.

MACLAURIN, ALEXANDER.

"Forestry in Sweden," in Rod and Gun, V, 4, pp. 154-156, Sept., 1903, Montreal.

MACOUN, JAMES M.

"Contributions to Canadian Botany, No. XVI," in Ottawa Naturalist, XVI, 11, pp. 211-223, Feb., 1903, Ottawa.

MACOUN, W. T.

"The Arboretum," in Rod and Gun, V, 5, pp. 198-202, Oct., 1903, Montreal.

MILLS, JAMES.

"Nature Study," in Bulletin 124, Ontario Agricultural College, pp. 3 and 4, Dec., 1902, Guelph.

MONTREAL NATURAL HISTORY SOCIETY.

"Report of Council, &c.," in Canadian Record of Science, Vol. IX, No. 2, pp. 133-137, Dec., 1903 Montreal.

MOTTET, S.

"L'etude Des Plants Sauvage," in Le Naturaliste Canadien, XXX, 11, pp. 166-168, Nov., 1903, Quebec.

MULDREW, W. H.

"Our Native Pines," read before Wellington Field Naturalist Club, published in Notes from Thicket and Swamp in the Guelph (Ontario) Herald, 18th Dec., 1903.

ODELL, WALTER S.

"Winter Growth of a Water Lily," in Ottawa Naturalist, XVII, 6, pp. 106, Sept., 1903, Ottawa.

OTTAWA FIELD NATURALIST CLUB.

Meetings of the Botanical Branch Ottawa Naturalist, Vol. XVII, No. 2, pp. 38-44, May, 1903, Ottawa. Also, *ibidem*, No. 3, pp. 58-60, June; No. 4 pp. 71-76, July; No. 5, pp. 93-96, August; No. 6, pp. 110-111, September; No. 7, pp. 127-128, October; and No. 8, pp. 140-142, November.

PENHALLOW, D. P.

"International Catalogue of Scientific Plants—Botany," Canadian Record of Science, IX, 2, pp. 139-141, Dec., 1903, Montreal.

"Notes on Tertiary Plants," in Trans. Royal Society of Canada, Section IV, 1903 (2nd series, Vol. IX), pp. 33 to 95, including one plate of the "Curve for Sequence in Development of North American Coniferæ," and 29 figures of microscopic sections, Ottawa.

ROBINSON, B. L.

"*Viola arvensis* in New England," in Rhodora, V, 53, pp. 155-156, May, 1903, Cambridge, Mass., U.S.A.

ROBINSON, C. B.

"Distribution of *Fucus serratus* in America," in Torreya, III, 9, pp. 132-134, Sept., 1903, New York, U.S.A.

ROD AND GUN IN CANADA.

Annual Meeting of the Canadian Forestry Association, in Vol. IV, 11, pp. 394-402, April, 1903, Montreal.

"Natural Reproduction in the Adirondack Forests," IV, 12, pp. 440-441, May, 1903, Montreal.

"Forestry and Colonization," V, 3, pp. 109-113, Aug., 1903, Montreal.

ROSS, N. M.

"The Ash," in Rod and Gun, IV, 10, pp. 369, 370, March, 1903, Montreal.

SARGENT, C. S.

"Recently Recognized Species of *Crataegus*—*C. Jackii*, *C. Aboriginum*, *C. Brunetiana*, *C. Fernaldi*, *C. Praecox*," in *Rhodora*, V, 54, pp. 159-168, June, 1903, Cambridge, Mass., U.S.A.

"Recently Recognized species of *Crataegus*," in *Rhodora*, V, 52, pp. 108-118, April, 1903, *ibidem*.

Recently Recognized Species of *Crataegus*," in *Rhodora*, V, 53, pp. 137-154, May, 1903, *ibidem*.

SEARS, F. C.

Botanical allusions in his report of the Provincial School of Horticulture of Nova Scotia, in the Annual Report of the Secretary of Agriculture for Nova Scotia for 1902, pages 70-90, 1903, Halifax.

SHUTT, FRANK T.

"On the Relation of Moisture-content to Hardiness in Apple Twigs," in *Trans. Royal Soc. Can. Section IV*, 1903 (2nd series, Vol. IX), pp. 149-153, Ottawa.

STEWART, E.

"Canadian Forests and Forestry," in *Rod and Gun*, V, 2, pp. 70-72, July 1903, Montreal.

UNWIN, A. HAROLD.

"The Art of Forestry," in *Rod and Gun*, V, 7, pp. 397-399, Dec., 1903, Montreal.

VIOLET, EUGÈNE.

"Rosier—Double et Triple Taille pour Multiplier les Fleurs," in *Le Naturaliste Canadien*, XXX, 9, pp. 142, 143, Sept., 1903, Quebec.

VROOM, J.

"Notes on Violets," *Bulletin Nat. Hist. Soc. of New Brunswick*, No. XXI, Vol. V, Pt. 1, pp. 121, 122, 1903, Saint John N.B.

WADDELL, JOHN.

"Suggestions to Teachers and Pupils on the Study of Botany," in *Educational Review*, XVI, 8, pp. 162, 163, Jan., 1903, Saint John, N.B.

"Further Notes on the Teaching of Botany," *ibidem*, 11, pp. 239-241, April, 1903.

WATSON, LAWRENCE.

"Violets of Prince Edward Island," in *P.E.I. Magazine*, June, 1903, Charlottetown, P.E.I.

"Francis Bain, Geologist,"—allusions to his botanical work in *P.E.I.*, in *Trans. Hoy. Soc.*, Vol. IX, Sec. IV, pp. 135-142, 1903, Ottawa.

WILLING, T. N.

"Plants Injurious to Stock," being *Bulletin No. 7*, Dept. of Agriculture, North-West Territories of Canada, 15 pp., 1903, Regina.

WRIGHT, R. RAMSAY.

"La Station De Biologie Maritime Du Canada," containing allusions to botanical work done. In *Le Naturaliste Canadien*, XXX, 1, pp. 1-7, Jan., 1903, Quebec.

ZAVITZ, C. A.

"The Story of a Grain of Wheat," in Bulletin 124, Ontario Agricultural College, pp. 16-19, Dec., 1902, Guelph.

Reports of Experimentalist in Annual Reports of Ontario Agricultural College at Guelph:

26th Report, 1901, pp. 96-125.

27th Report, 1902, pp. 82-111.

28th Report, 1903, pp. 105-138.

IX.—*Bibliography of Canadian Zoology for 1903, Exclusive of Entomology.*

By J. F. WHITEAVES.

(Read by title, June 21, 1904).

MAMMALIA.

BENSLEY, B.A.

On the Evolution of the Australian Marsupialia; with Remarks on the Relationships of the Marsupials in general.

Transactions of the Linnæan Society of London, Dec., 1903, Second Series, Zoology, Vol. IX, pt. 3, pp. 83-217, plates 5, 6 and 7.

BROOKS, ALLAN.

Mammalia of Northern Wellington (Ont.).

Notes from Thicket & Swamp, in Guelph Herald, March 4, 1904.

BURMAN, REV. W. A.

Moose with Elk Antlers.

Ottawa Naturalist, June, 1903, Vol. XVII, No. 3, p. 57.

DAVIDSON, A. A.

The Varying Hare.

Notes from Thicket & Swamp, in Guelph Herald, Dec. 4, 1903.

HUARD, L'ABBÉ V. A.

Une chasse à la Baleine dans le Saint-Laurent.

(Records the capture of a Hump-backed whale, *Megaptera nodosa*, Bonn, at Saint Roch des Aulnaies, L'Islet).

Le Naturaliste Canadien, Sept., 1903, Vol. XXX, No. 9, pp. 132-137.

KLUGH, A. B.

Notes on *Putorius Novboracensis*.

Notes from Thicket & Swamp, in Guelph Herald for Nov. 13, 1903.

BIRDS.

ATKINSON, G. E.

Insectivorous Birds of Manitoba.

Historical and Scientific Society of Manitoba, Transactions No. 60, pp. 1-20.

BEATTIE, F. N.

The Crossbills. (Notes on these birds at Guelph for five years.)

Notes from Thicket & Swamp, in Guelph Herald for Dec. 24, 1903.

BROOKS, ALLAN.

Notes on the Birds of the Cariboo District, British Columbia.

The Auk, July, 1903, Vol. XX, pp. 277-284.

DIONNE, C. E.

Des difformités du bec chez les oiseaux.

Le Naturaliste Canadien, June, 1903, Vol. XXX, No. 6, pp. 81 and 82.

DWIGHT, JONATHAN, Jun. (M.D.).

Some New Records for Nova Scotia.

(The species recorded are the Kentucky Warbler, Lark Sparrow, Dickcissel, Black Tern, Stilt Sandpiper, Baltimore Oriole and Mocking Bird.)

The Auk, Oct., 1903, Vol. XX, pp. 439 and 440.

FLEMING, J. H.

Recent Records of the Wild Pigeon and Turkey Vulture at Moose Factory, James Bay.

The Auk, Jan., 1903, Vol. XX, p. 66.

Breeding of the Evening Grosbeak in Captivity.

Idem, April, 1903, Vol. XX, pp. 213-215.

FLETCHER, DR. JAMES.

Bird Notes.

(The "Notes" are on Ottawa specimens of the Canadian Ruffed Grouse and Pine Grosbeak.)

Ottawa Naturalist, Dec., 1903, Vol. XVII, No. 9, pp. 163 and 164.

GUILLET, DR. CEPHAS.

Curiosity of a Humming Bird.

Ottawa Naturalist, June, 1903, Vol. XVII, No. 3, pp. 55 and 56.

HALKETT, ANDREW.

Herring Gull's Eggs.

Ottawa Naturalist, Sept., 1903, Vol. XVII, No. 6, p. 112.

HEDLEY, ROGER T.

A Rough-shouldered Hawk in Captivity.

Ottawa Naturalist, June, 1903, Vol. XVII, No. 3, pp. 53 and 54.

HOWE, REGINALD HEBER, Jun.

A further Note on the Subspecies of *Passerculus sandwichensis* inhabiting Labrador.

The Auk, April, 1903, pp. 215 and 216.

KEAYS, J. E.

Notes on the Size of Hawks' Eggs.

Ottawa Naturalist, Jan., 1903, Vol. XVI, No. 10, pp. 201-205.

KELLS, W. L.

Notes on Canadian Vireos. (Nos. 1-5.)

Notes from Thicket & Swamp, in Guelph Herald for Oct. 30, Nov. 13 and 27, and Dec. 11 and 24, 1903.

Nesting of Some Canadian Warblers (Third paper).

Ottawa Naturalist, July, 1903, Vol. XVII, No. 4, pp. 68-71.

KLUGH, A. B.

A few notes on the Oven-bird.

Notes from Thicket & Swamp, in Guelph Herald, Nov. 13, 1903.

LEMOINE, SIR J. MACPIERSON.

Nos Amis les Oiseaux, en Hiver.

Le Naturaliste Canadien, April, 1903, Vol. XXX, No. 4, pp. 49 and 50.

MACOUN, PROF. JOHN.

Catalogue of Canadian Birds. Part II.

Published by the Geological Survey of Canada at Ottawa in 1903.

The Cowbird in Winter.

Ottawa Naturalist, Feb., 1903, Vol. XVI, No. 11, pp. 225 and 226.

MACOUN, W. T.

The Nesting of Birds at the Central Experimental Farm, Ottawa.

Ottawa Naturalist, May, 1903, Vol. XVII, No. 2, pp. 25-31.

MOORE, W. H.

Prairie Horned Lark Nest in New Brunswick.

Ottawa Naturalist, Feb., 1903, Vol. XVI, No. 11, pp. 226 and 227.

OTTAWA FIELD NATURALISTS' CLUB.

Report of the Ornithological Branch, 1902.

Ottawa Naturalist, May, 1903, Vol. XVII, No. 2, p. 32.

PERRIN, EMERY.

A Robin Story.

Ottawa Naturalist, Oct., 1903, Vol. XVII, No. 7, pp. 122 and 123.

SMITH, L. H.

My Pet Crows.

Ottawa Naturalist, Sept., 1903., Vol. XVII, No. 6, pp. 101-103.

TERRILL, L. MC. I.

Notes on the Nesting Habits of the Brown Creeper and Hudsonian Chickadee.

Ottawa Naturalist, Aug., 1903, Vol. XVIII, No. 5, pp. 92 and 93.

YOUNG, REV. C. J.

Our Warblers. No. 1.

Notes from Thicket & Swamp, in Guelph Herald, Dec. 11, 1903.

REPTILES, BATRACHIA AND FISHES.

COX, PHILLIP, Ph.D.

The Snakes of the Maritime Provinces of Canada.

Proceedings of the Miramichi Natural History Association, No. III, pp. 11-20.

Reduction in the number of Fin-rays of certain Flat-fishes.

Idem, pp. 42-47.

GUILLET, DR. CEPHAS.

Note on the Blue-tailed Lizard.

Ottawa Naturalist, March, 1903, Vol. XVI, No. 12, p. 239.

HARRINGTON, W. HAGUE.

Mud Puppies.

Ottawa Naturalist, Feb., 1903, Vol. XVI, No. 11, pp. 223-225.

HUARD, L'ABBÉ V. A.

Comment certains poissons survivent au dessèchement des pièces d'eau ou ils habitent.

Le Naturaliste Canadien, July, 1903, Vol. XXX, No. 7, pp. 100-103.

KNIGHT, PROF. A. P.

Sawdust and Fish Life.

Queen's Quarterly, Jan., 1903, Vol. X, pt. III, pp. 367-379.

PRINCE, PROF. E. E.

The Fish-way problem.

Thirty-fifth Annual Report of the Department of Marine and Fisheries, Ottawa, pp. LXI-LXXXI.

The hatching of shad.

Idem, pp. LXXXII-LXXXVI.

WILLIAMS, J. B.

A Further Note on the Blue-tailed Lizard.

Ottawa Naturalist, June, 1903, Vol. XVII, No. 3, p. 60.

INVERTEBRATA.

BAILEY, G. W.

The Land Snails of New Brunswick.

Bulletin of the Natural History Society of New Brunswick, No. XXI, Vol. V, pt. 1, pp. 15-34.

COE, W. R., and KUNKEL, B.W.

A new species of Nemertean (*Cerebratulus melanops*) from the Gulf of St. Lawrence.

Biological Bulletin, Boston, Feb., 1903, Vol. IV, No. 3.

Quoted in "Science," March 6, 1903, p. 385.

DALL, DR. W. H.

Synopsis of the Family Astartidae, with a review of the American species. (Includes, incidentally, a revision of the nomenclature of all the recent species of *Astarte* from the Atlantic and Pacific coasts of Canada.)

Proceedings of the U. S. National Museum, Vol. XXVII, pp. 933-951, with Plates LXII and LXIII.

Synopsis of the Carditacea and of the American Species.

(Includes, also, incidentally, a revision of the nomenclature of all the Canadian species of this family.)

Proceedings of the Academy of Natural Sciences of Philadelphia, Nov., 1902 (issued Jan. 20, 1903), pp. 696-716.

Note on the preceding paper.

(In this note Dr. Dall suggests that, as the name *Miodon*, Carpenter (1864), was used for an ophidian by Dumeril in 1859, that Carpenter's genus be called *Miodontiscus*. If this suggestion be adopted, the little marine bivalve from the Vancouver region, that has so long been called *Miodon prolongatus*, will have to be called *Miodontiscus prolongatus*.)

The Nautilus, April, 1903, Vol. XVI, No. 12, p. 143.

LATCHFORD, HON. F. R.

Niagara River Shells.

(A list of eight species of fresh water shells collected at the "Falls" by Dr. James Fletcher.)

Ottawa Naturalist, Jan., 1903, Vol. XVI, No. 10, pp. 205 and 206.

MATTHEW, W. D., AND STEAD, G.

Land and fresh water shells collected near St. John, N.B.

Proceedings of the Miramichi Natural History Association, No. III, pp. 48 and 49.

MACBRIDE, PROF. E. W.

The Development of *Echinus esculentus*, together with some points in the development of *E. miliaris* and *E. acutus*.

Philosophical Transactions of the Royal Society of London, Series B, Vol. 195, pp. 285-327, Plates 7-16.

The Brain of the Larva of *Echinus esculentus*.

Science, March 27, 1903, N.S., Vol. XVII, No. 430, pp. 492 and 493.

Report on a small collection of Echinoderm Larva made by Mr George Murray, F.R.S., during the Cruise of the 'Oceana' in November, 1898.

Annals and Magazine of Natural History, May, 1903, Seventh Series, Vol. XI, pp. 477 and 478.

M'INTOSH, PROF. W. C.

Notes from the Gatty Marine Laboratory, St. Andrews.

2. On Canadian Eunicidæ dredged by Dr. Whiteaves, of the Canadian Geological Survey, in 1871-73.

Annals and Magazine of Natural History, July, 1903, Seventh Series, Vol. XII, pp. 149-164.

NORMAN, REV. CANON A. M.

Notes on the Natural History of East Finmark (Two papers).

(These incidentally contain a revision of the nomenclature of a large number of species of marine polyzoa from the River and Gulf of St. Lawrence.)

Annals and Magazine of Natural History, June and July, 1903, Seventh Series, Vol. XII, pp. 567-598, and Vol. XII, pp. 87-128.

PIERS, HARRY.

Report on the Provincial Museum of Nova Scotia and Science Library, for 1902, Halifax, 1903.

(Among the accessions to the Museum recorded on page 5, are "several Blue Crabs (*Callinectes sapidus*) new to the province, taken at Cow Bay.")

PILSBRY, H. A.

Helix hortensis at Percé, P.Q.

Reported by Dr. John M. Clarke.

(The species, which malacologists now prefer to call *Cepæa hortensis*, had previously been recorded as occurring at many points on the south shore of the lower St. Lawrence from Brandy Pots, Hare Island, and Métis, to Gaspé Bay; at Anticosti, and the Magdalen Islands.

The Nautilus, Oct., 1903, Vol. XVII, p. 71.)

STAFFORD, DR. J.

Two Diotomes from Canadian Urodela.

Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, Jena, 1903.

Miscellaneous.

HUARD, L'ABBÉ V. A.

La Station de Biologie Maritime.

Le Naturaliste Canadien, Oct., 1903, Vol. XXX, No. 10, pp. 149-151.

WRIGHT, PROF. R. RAMSAY.

La station de biologie maritime du Canada.

Le Naturaliste Canadien, Jan., 1903, Vol. XXX, No. 1, pp. 3-7.

X.—*Influence de la situation géographique de la ville de Québec sur un point de météorologie locale.*

PAR MGR. J. C. K. LAFLAMME.

(Lu le 22 juin 1904.)

La direction générale du St-Laurent, dans la province de Québec, est orientée du sud-ouest au nord-est, et, l'on peut dire que ce fleuve en est comme l'axe central. Aussi, exception faite des bassins des lacs St-Jean et Nominigue ainsi que des vallées sud de la péninsule de la Gaspésie, le St-Laurent est bien la ligne de chaque côté et le long de laquelle se sont successivement groupés les différents centres de colonisation. Les nouveaux colons étaient sûrs de trouver sur ses rivages une plaine fertile, se développant souvent jusqu'à une assez grande distance du fleuve, et ce dernier leur donnait un moyen de communication à la fois facile et avantageux, pour leurs relations commerciales soit extérieures, soit intérieures.

Voilà pourquoi sans doute, lors des premiers arpentages des terres, on a tenu si grand compte de l'orientation de cette ligne géographique maîtresse. Voilà pourquoi les diverses seigneuries, ainsi que leurs subdivisions en fermes ou en concessions, ont été alignées perpendiculairement ou parallèlement au fleuve. A tel point que, pour les gens non instruits, et même dans le langage courant de tous les habitants, les quatre points cardinaux, à Québec, sont : le nord-est, le sud-ouest (sorouet), le nord et le sud. Ces deux dernières expressions désignent invariablement le nord-ouest et le sud-est. On n'a pas de notions exactes sur la direction précise du nord et du sud astronomiques.

L'orographie générale de la province est presque aussi simple que la topographie. A part les montagnes volcaniques isolées de la région de Montréal, les reliefs de Québec appartiennent à une double chaîne de hauteurs, se développant de chaque côté du fleuve, à une distance variable. La chaîne du nord longe le St-Laurent, depuis le Labrador jusqu'au Cap Tourmente puis s'en éloigne graduellement jusque dans les environs d'Ottawa. Celle du sud commence par les Shikshoes, dans la péninsule de la Gaspésie, se prolonge par les monts Notre-Dame, les collines des Cantons de l'est, et va se fondre, aux environs du lac Champlain, avec les différents chaînons qui terminent les Appalaches dans le Nouvelle-Angleterre.

Entre les deux séries d'élévations se déploie la plaine agricole de la province. C'est une surface très unie, couverte d'un sol arable très riche, remanié et régularisé, à l'époque Champlain, par l'invasion du

bras de mer qui faisait alors communiquer l'Atlantique avec le lac Champlain et les grands lacs d'Ontario.

Si l'on examine une carte de la province, on voit que les Laurentides, au nord, et les monts Notre-Dame, au sud, ne sont pas parallèles. Aux limites orientales de la province, elles sont séparées par l'immense estuaire du St-Laurent. Puis elles se rapprochent insensiblement en remontant le fleuve jusqu'à Québec. Elles s'éloignent ensuite l'une de l'autre en gagnant l'ouest.

Il en résulte que la ville de Québec est placée au point de jonction de deux entonnoirs orographiques qui se touchent par leurs pointes. Le premier, le plus long et le plus étroit, s'ouvre vers le nord-est; le second, plus large et plus court, est dirigé vers le sud-ouest.

Or l'influence des reliefs terrestres sur la direction et la vitesse des vents superficiels est très grande. Par conséquent, on devra s'attendre a priori à trouver, à Québec, un système de vents qui se ressent, dans une large mesure, de la disposition orographique que nous avons décrite plus haut.

L'observation confirme ces prévisions. Nous ne constatons pour ainsi dire, dans les environs de la capitale de notre province, que des vents de nord-est et de sud-ouest. Chaque tourbillon cyclonique commence invariablement par des vents de nord-est et se termine par des brises de sud-ouest. Il faut en dire autant des anticyclones qui ne donnent jamais que des vents de sud-ouest ou de nord-est, suivant que le centre de haute pression est à l'ouest ou à l'est de la ville.

Dans les régions de la Beauce, du lac St-Jean et du lac Nominé, les courants élémentaires de ces tourbillons atmosphériques suivent les lois générales qui les régissent partout ailleurs. Mais, à Québec, ils se ramènent toujours aux deux directions que nous venons d'indiquer, orientés qu'ils sont par le double entonnoir orographique de la province. Que les centres de pression ou de dépression passent au nord ou au sud du fleuve, peu importe; les vents qu'ils occasionnent, soufflent toujours, à Québec, du nord-est ou du sud-ouest. Et c'est de cette façon qu'on peut expliquer le fait assez anormal à première vue de la différence de direction que l'on constate très souvent, lors du passage d'un cyclone, entre la direction du vent à la surface du sol et celle des nuages, même lorsque ces derniers sont relativement bas.

Mais il est une autre particularité de notre système de vents locaux sur laquelle je tiens à attirer l'attention.

Le printemps, nous avons fréquemment des vents de nord-est qui semblent n'avoir aucune relation avec les cyclones ou les anticyclones.

Ces vents se font sentir pendant plusieurs semaines consécutives. Ils augmentent en intensité pendant le jour, pour diminuer la nuit.

Le ciel reste pur, sauf, par intervalle, quelques légers cirrhus, très élevés, qui viennent d'un point quelconque de l'ouest, emportés qu'ils sont par la circulation atmosphérique générale de nos latitudes.

Ces vents sont peu profonds. Je veux dire que l'épaisseur verticale de l'air atmosphérique qu'ils affectent est relativement restreinte. J'ai constaté qu'en une circonstance, alors que nous avions à la ville un vent de nord-est très fort, capable de briser les feuilles encore tendres de nos arbres, j'ai constaté, dis-je, que sur les flancs des Laurentides, à moins de 1500 pieds de hauteur, ce vent ne s'était pas fait sentir. Au contraire, il y soufflait alors une légère brise du sud-ouest. Souvent encore, lorsque ces vents sont violents, on peut voir de Québec une longue bande de nuages glissant sur le versant des Laurentides, poussés, dans leur partie inférieure, vers le sud-ouest et vers le nord-est dans leur partie supérieure. Ces nuages sont évidemment l'effet de la condensation de la vapeur d'eau, condensation qui résulte du contact des deux masses d'air ayant des températures différentes; je veux dire l'air froid inférieur venant des régions de l'est, et l'air tiède et humide de l'ouest qui glisse à des niveaux plus élevés.

La persistance de ces vents du printemps est tellement remarquable, qu'elle a donné lieu à plusieurs dictons populaires qui, tous, reviennent à nous prédire des vents de nord-est à peu près continus pour les mois d'avril, de mai et le commencement de juin.

Quelle peut être la cause d'un phénomène météorologique local si nettement caractérisé?

Sans doute, les observations ne sont encore ni assez nombreuses, ni assez prolongées, pour qu'on puisse affirmer quoi que ce soit de définitif. Cependant, on nous permettra de risquer une explication provisoire.

Examinons pour cela l'état physique des deux entonnoirs orographiques de Québec au milieu de la saison du printemps, soit vers la fin d'avril et le commencement de mai. A ce moment, l'entonnoir occidental n'est plus couvert de neige, le soleil a déjà notablement réchauffé la surface du sol, et l'air qui la touche participe nécessairement à son élévation de température. L'entonnoir oriental, au contraire, est encore relativement froid. La plus grande partie, en effet, en est occupée par les eaux du fleuve, lesquelles sont refroidies par les glaces qu'elles charrient encore ou qui viennent d'y fondre, refroidies encore par l'eau des rivières qui s'y déversent et qui arrivent toutes glacées par la fusion de la neige du dernier hiver. De plus le sol lui-même est plus froid. Les chaleurs du printemps commencent à Montréal près d'un mois avant de se faire sentir à Rimouski.

Donc, à ce moment, l'équilibre thermique des deux parties de notre province est rompu. La température est élevée à l'ouest et relativement basse à l'est.

Conformément aux lois générales, l'air chaud doit s'élever dans les régions supérieures de l'atmosphère, et l'air froid des régions voisines affluer pour le remplacer. Donc l'air froid des régions orientales de la province se portera du côté de l'ouest, là où se produisent les mouvements ascensionnels de convection, et le vent soufflera du nord-est vers le sud-ouest. A raison du rétrécissement progressif de l'entonnoir oriental, la force des vents ira en augmentant graduellement jusque dans les environs de Québec où elle atteindra son maximum. Puis, à l'ouest comme la masse d'air en mouvement est distribuée sur une surface plus étendue, sa vitesse diminuera peu à peu, pour disparaître tout à fait et se fondre dans le mouvement de convection qui emporte l'air échauffé vers les régions supérieures de l'atmosphère.

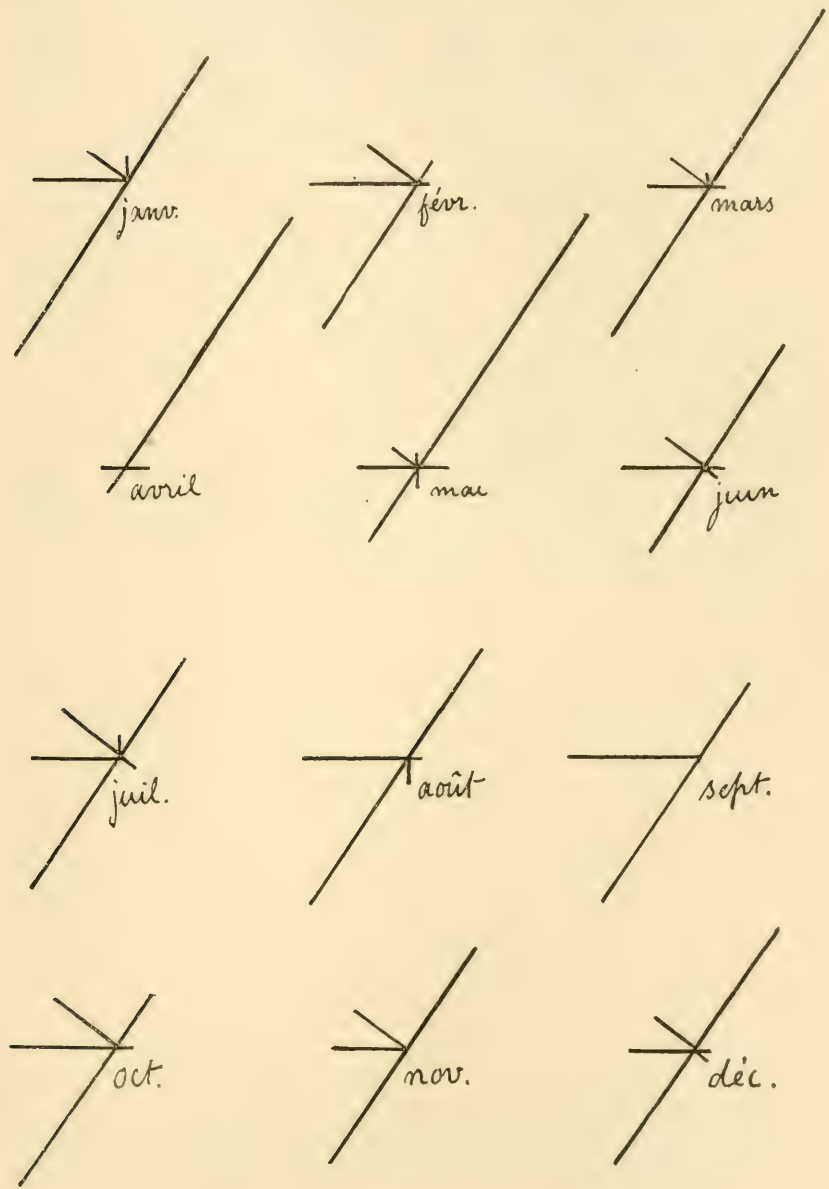
Si ces idées sont exactes, dans la mesure où les conditions qu'elles supposent se réalisent, nos vents d'est du printemps doivent se continuer tant que l'équilibre thermique des deux parties de la province n'aura pas été sensiblement rétabli. C'est dire qu'ils se feront sentir surtout pendant les mois du printemps. Plus tard, en été, les choses changent. Alors nous retrouvons à Québec les variations de circulation atmosphérique qui se rencontrent d'ordinaire aux autres points du globe placés à des latitudes correspondantes, c'est-à-dire, une prédominance marquée des vents de sud-ouest, interrompus de temps à autre par l'arrivée des tourbillons cycloniques.

Sans doute, quelques-uns de ces tourbillons passent aussi sur Québec pendant la période dont je viens de parler et que j'appellerais volontiers la période des moussons de nord-est ou moussons du printemps. Mais on les en distingue aisément par le fait que le vent, au lieu de diminuer le soir, augmente d'intensité et qu'il est accompagné d'une précipitation plus ou moins abondante, ce qui n'arrive presque jamais dans les cas où la mousson est définitivement établie et se fait seule sentir.

Pendant les mois d'automne, et pour les raisons que nous avons données plus haut, la mousson du nord-est souffle encore quelquefois. Mais elle n'a jamais le même caractère d'intensité et de continuité que celle du printemps. Pendant l'hiver et l'été, à Québec comme partout, on retrouve la grande circulation atmosphérique qui entraîne la masse générale de l'air de l'ouest vers l'est. On voudra bien remarquer cependant l'orientation très nette que doit lui imprimer la ligne du St-Laurent.

M. Smith, directeur de l'observatoire météorologique de Québec, a bien voulu nous communiquer le résultat des observations qu'il a faites sur le sujet que nous traitons en ce moment. Nous résumons les chiffres de ses tableaux dans les diagrammes mensuels qui accompagnent ce travail. Nous avons choisi l'année 1901, mais les résultats

auraient été sensiblement les mêmes si nous avions pris une année quelconque de la dernière décade.



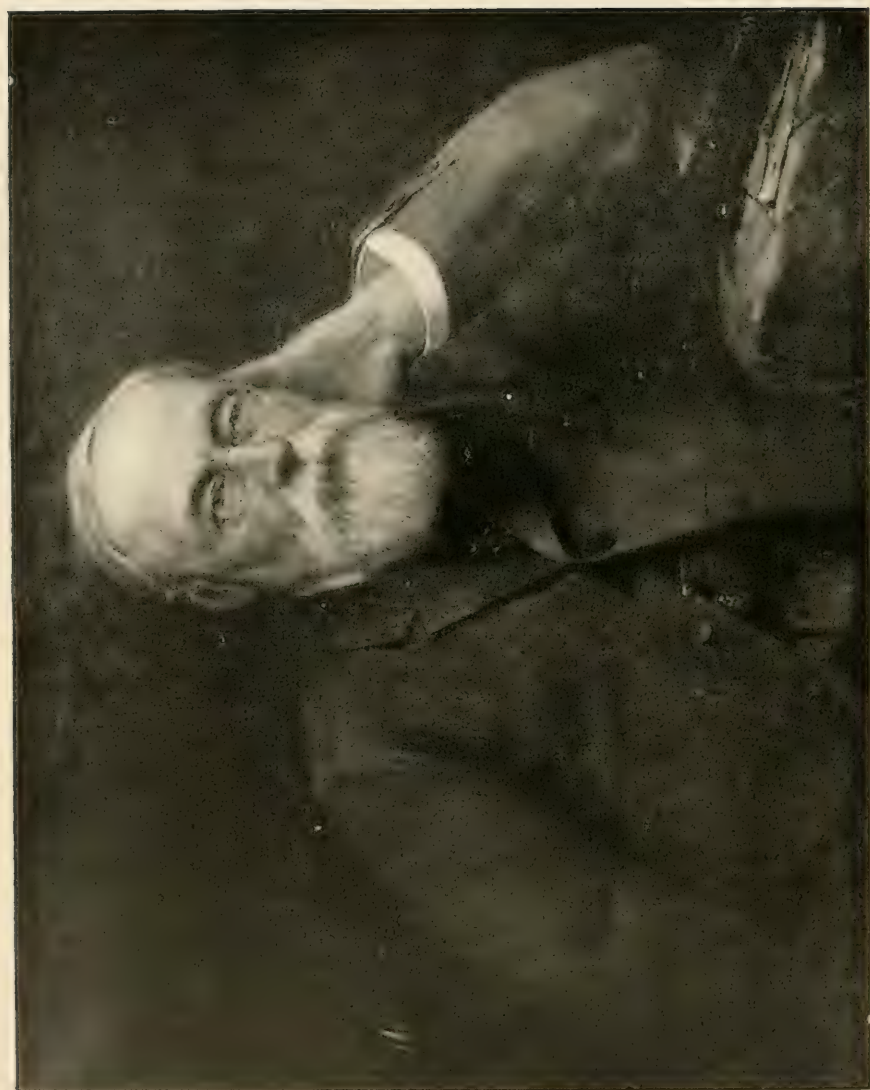
Vents de Québec en 1901

Il résulte de l'examen de ces diagrammes que les vents prédominants à Québec sont bien ceux de nord-est et de sud-ouest; de plus, que, dans les mois du printemps (avril, mai et juin), les vents de nord-est l'emportent de beaucoup sur les autres. Nous croyons que l'explication de ce double fait est celle que nous avons essayé de donner dans ces quelques notes.¹ Les vents qui soufflent de l'ouest viennent au troisième rang au point de vue de la durée. Ils doivent être rapportés à la circulation atmosphérique générale.

On remarquera que, dans quelques-uns de ces diagrammes, certains vents ne sont pas indiqués. La raison en est que la nombre d'heures qu'ils se sont fait sentir est tellement restreint qu'il nous aurait été impossible de les indiquer par des lignes de longueur appréciable. Quelquefois même ils ont fait complètement défaut.

En terminant, qu'il nous soit permis de faire une suggestion. Pourquoi ne chercherait-on pas à installer des stations d'observations météorologiques en un grand nombre de points de notre pays? Ces observatoires ne sont pas dispendieux, et il est certain qu'une discussion raisonnée des observations ainsi faites serait de nature à faire avancer notablement la météorologie régionale. Et, au fond, c'est bien celle qui nous intéresse le plus.

¹ Les gens qui habitent la campagne, dans les environs de Québec, connaissent tellement bien cette prépondérance des vents de nord-est et de sud-ouest, qu'ils en tiennent compte lorsqu'il s'agit de construire leurs maisons ou leurs granges. Chaque fois que ces constructions sont grandes, ils ne manquent pas de les orienter de telle façon que les côtés les plus étroits soient seuls exposés aux vents les plus fréquents. Ils tiennent tellement à cela que, pour y arriver, ils n'hésitent pas à donner à ces édifices une direction oblique par rapport au chemin public, ce qui peut paraître étrange à ceux qui ne sont pas du pays.



DR. A. R. C. SELWYN, C.M.G., LL.D., F.R.S., F.G.S.

XI.—*Memorial or Sketch of the Life of the late Dr. A. R. C. Selwyn, C.M.G., LL.D., F.R.S., F.G.S., etc., etc., Director of the Geological Survey of Canada from 1869 to 1894.*

By H. M. AMI, M.A., D.Sc., F.G.S.
Of the Geological Survey of Canada.

(Read June 23, 1904.)

Geological science in Canada has suffered very severe losses during the past few years. The two Dawsons, father and son, who had been foremost in advancing the best interests of geology for the past forty years, died within a brief space of time one from the other. They were both presidents of the Royal Society of Canada in turn, the former its first president in 1882, the latter its president in 1894. They were Nestors in geology. Now, we are grieved to chronicle the loss of another eminent geologist; one, who for twenty-five years wrought hard as the head of the Geological Survey of Canada and as successor to the eminent founder of that important bureau of information for the people of Canada, Sir William Logan.

Since the loss of Sir Wm. Logan in 1876, and that of Billings about the same time, combined with the loss of Dr. Thomas Sterry Hunt, a few years later, that splendid triumvirate who gave us that excellent compendium of geology, "The Geology of Canada," published by the Geological Survey of Canada in 1863, at no period in the history of this country has there been such a loss from the ranks of those engaged in recording the stores of plenty in the earth's crust, as well as in deciphering the story of this world as it is written in indelible traits on the marvellous pages of the great book of Nature in Canada.

Dr. A. R. C. Selwyn, C.M.G., LL.D., F.R.S., F.G.S., for twenty-five years the eminent Director of the Geological Survey of Canada (1869-1894), and one of the original Fellows of the Royal Society of Canada, died in Vancouver, British Columbia, on Sunday the 19th day of October, 1902, the result of a stroke of paralysis.

His death was not altogether unexpected, for he had been ailing for some time past, but it removed from our midst one of the most active and energetic personalities in the field of geological work and science in North America. Selwyn did much to advance the practical or economic side of geology as well as the highest fundamental principles on which that science is based. His coming to America marks an era in the progress of geological thought and investigation, inasmuch

as he brought with him the practical experience of nearly thirty years' work on the geological surveys of Great Britain and Australia, more especially in those formations of the earth's crust which belong to the older palæozoics and also in the igneous masses associated with them round which so many minerals of economic value occur, the nature of which he emphasized strongly, and to which he was one of the first to draw special attention as well as to interpret in their right light in Canada. During all the years he spent in Canada he was diligent in mapping, or having mapped, the volcanic rocks of the various regions, examined. It is interesting to note that Principal Dresser's paper,¹ giving the result of his studies on the petrography of the Eastern Townships of the Province of Quebec, issued a short time previous to the time of Dr. Selwyn's death, confirms in a marked degree the anticline theory of the structure of the Sutton mountain and other volcanic belts of that part of Canada.

Selwyn was the son of the late Reverend Townsend Selwyn, canon of Gloucester Cathedral, by his wife, Charlotte Sophia, daughter of Lord George Murray, Bishop of St. David's, and grand-daughter of John, the fourth Duke of Athol. He was born in Kilmington, Somersetshire, England, on the 28th day of July, 1824.

His studies were carried out at home, first under private tutors; and later he completed his education in Switzerland.

WORK IN ENGLAND, WALES AND ANGLESEY.

At the early age of twenty-one (1845) he was appointed to a position in the Geological Survey of Great Britain under Sir Henry de la Beche. His earliest work on the British Survey was under the immediate supervision of no less distinguished a geologist than A. C. Ramsay. He was one of that contingent of stratigraphical geologists under Ramsay, who did so much to lay down the fundamental and carefully traced lines separating the various geological formations in that wonderful compendium of geology that England has proved to be all in a nutshell. The others on the staff with Selwyn were:—W. T. Aveline, Trevor E. Jones, D. H. Williams, H. W. Bristow, and W. H. Bailey. Edward Forbes was the palæontologist, W. W. Smythe the mining geologist, Sir Joseph Hooker was the botanist, Dr. Lyon (later Sir Lyon) Playfair the chemist, while Richard Phillips was in charge of the laboratory and museum, with Robert Hunt as keeper of

¹ "A petrographical contribution to the geology of the Eastern Townships of the Province of Quebec." *American Journal of Science*, 4th series, Vol. XIII, No. 70, pp. 43-48, July, 1902, New Haven.

the mining records. Mr. C. R. Bone was employed as artist, and C. P. Gibbs as collector of fossils.

Under chiefs like Sir Henry de la Beche and A. C. Ramsay, Selwyn made rapid strides in the science of geology, for which he had acquired a taste during his stay in Switzerland.

He remained attached to the Geological Survey of Great Britain until 1852, and devoted his energies to elucidating and mapping the difficult and intricate structure of the Palæozoics of North Wales and adjacent portions of Western England.

He is credited with no less than sixteen geological maps prepared either entirely by himself or in conjunction with his chief, Sir A. C. Ramsay, or the Director-General himself, or, again, with such well-known men on the geological staff as Ed. Hull, W. T. Aveline, W. W. Smythe, J. Phillips, S. B. Howell and his life-long particular friend and colleague, J. B. Jukes.

The geological sheets or maps of Leominster, Montgomery, Market Drayton, Harlech, Bangor, Bardsey and Machynlleth are ascribed in part or in whole to the subject of this brief sketch.

It was during his field work in Wales that Selwyn discovered the unconformity between the lowest Cambrian and the older series of schists underneath. In this classic country of the Welsh succession, Selwyn and Ramsay worked together and at one of those "Councils" held on the Shropshire sheets the latter wrote at the time in his field notebook:—"Held a council with Selwyn on the Shropshire sheets, etc., his work there and here (North Wales) is the perfection of beauty." "One of the most striking sections of the whole series of sections published by the Geological Survey," writes Sir Archibald Geikie later, "runs from the top of Snowdon parallel with the Llanberis valley to the Menai straits at Llanfair, whence it was afterwards continued across Anglesey. On the other side it was prolonged south-eastwards into the country mapped by Selwyn and was carried by him into Merionethshire, across Cynicht, Moel Wyn and Aran Moddwy, and was continued by Aveline across Montgomeryshire." Sir Archibald adds:—"The geological structure is portrayed by Ramsay and Selwyn with a boldness and vigour, and at the same time with an artistic feeling, which had hardly been equalled in geological section drawing."

In 1845 Selwyn worked out the complicated geology of the volcanic district of Cadar Idris in North Wales. In the summer of 1846 he was engaged in mapping out the rock formations in the Dolgelly region, whilst Aveline was tracing the boundaries of the Silurian series from Llanbrynmair eastward to the Church Stretton and Longmynd. Ramsay accompanied Selwyn and records:—"Glorious days and glorious

scenery, out with Selwyn along the front of Cader Cliffs." He adds:—"Selwyn's work good." Testimony from such a source must have been very gratifying to young Selwyn, who rose step by step and advanced in favour amongst his colleagues and superiors.

In August, 1847, his work lay in the direction of Festiniog, in which he was associated with Ramsay, Playfair, Jukes and Gibbs. This difficult region offered many problems of economic as well as of geological interest and careful results obtained were discussed on the ground and incorporated in the classic maps since prepared. The same year Selwyn was at Capel Curig, Jukes was transferred to the South Staffordshire coalfield, and in writing to Ramsay of Selwyn's work says:—"It so happens that the last time I saw Selwyn, we were mutually wishing that you would send us both into Staffordshire together." After leaving Wales the subject of this sketch carried on his investigations in part of Shropshire as far north as the Triassic of Prees.

The friendship which had arisen between Jukes and Selwyn in their joint work in Wales grew as years went on; and in 1848 they communicated a paper to the Geological Society of London giving the results of their investigations in North Wales.¹

This friendship was kept well alive during all the years that Dr. Selwyn was Director of the Geological Survey of Canada, as many of his colleagues of those years can testify, for, whenever difficult points in the stratigraphy and palæontology of different portions of Canada arose and were discussed in a forceful and masterly but always courteous and gentlemanly manner, he was wont to quote the words of his friend Jukes in this fashion:—"As my friend Jukes used to say, "If the palæontology does not agree with the stratigraphy, so much the worse for the fossils.'"

In 1848 Selwyn's work took him to the Port Madoc and Dolgelly district of North Wales. There, he and Ramsay pursued their work amid the glorious scenery surrounding the heights of Snowdon and the magnificent and view-bedecked viewpoints of the foot ranges. In October of that year considerable discussion arose regarding the structure and succession of Glaslyn, and thither Sir Henry de la Beche, Edward Forbes and also Ramsay went, to determine if possible the points in question, and to settle them on the spot. Selwyn was at work on the side of the Crib-goch, on the top of a crag, and his well known shrill shout soon reached Ramsay who discovered him, and later in the day they all joined forces, compared notes, and finally put matters straight at Glaslyn.

¹ A. R. Selwyn and J. B. Jukes. Sketch of the structure of the country extending from Cader Idris to Moel Siabod, North Wales." *Quarterly Journal Geological Society*, London, Vol. VI, pp. 300-302, 1848.

Many a knotty problem in Cambrian geology was discussed by these masters of geology in the lovely vale of Beddgelert, where Selwyn was located, or at Llamberis, which Ramsay and Forbes made their headquarters. In 1849 Selwyn completed the survey of the rock formations lying between the Snowdon range on the north and Festiniog and Tremadoc on the south, and turned his attention to Lleyn peninsula from Pwllheli. At Aber, and as late as December of the same year, Ramsay and Jukes joined Selwyn and had a very pleasant meeting. The following year saw the same trio at Merchlin in North Wales, where many conferences were held on critical points touching sundry lines to be drawn as boundaries between different geological formations.

Selwyn was an alpinist or mountain climber of no mean order. From the experience gained when in the Swiss Alps it was a pleasure and no effort for him to climb the peaks and scale the heights of the Snowdon range, not to speak of the numerous crags of the region surrounding the same, which he traversed in his geological explorations. Later in life, in the Mount Serle region of South Australia, and in the district surrounding Mount Alexander, as well as in the Canadian Rockies, he was a most intrepid climber. Ramsay states that he was out on the hills with Selwyn one day (4th May, 1850) as far as the cliffs under Carned Llewelyn and down the Melynlyn and Lyndulyn. Besides good work done on that day, "Selwyn executed a most perilous feat of cliff climbing; a slip and he would have been slain." Later, while in Canada and during the Rocky Mountain excursion in connection with the meeting of the British Association for the Advancement of Science in 1884, Dr. Selwyn had a most narrow escape for his life at the mouth of the tunnel near the base of Mount Stephen. His keen eye detected the loosening rock-mass above, his agility and wonderful presence of mind led him to jump on adjoining timbers thus saving his life on this occasion.

In the closing months of 1850, after completing the North Wales sections and maps and putting on the final touches in conjunction with Sir Andrew Ramsay, Selwyn was next entrusted with field work in Anglesey, where they crossed and carried on investigations begun by Sir Henry de la Beche. It was in Anglesey that Selwyn again detected the unconformity of the lowest Cambrian strata upon an older Pre-Cambrian series of schists. In this view Sir Henry supported Selwyn, but Ramsay on this occasion differed, so that when the map was published, no Pre-Cambrian rocks were shown. In the following year (1851) Selwyn was back at Dolgelly, checking a number of points and investigating critical parts of the complex geological structure.

Selwyn was of a bright and cheery disposition, and besides the happy reunions held in London on the part of the "Royal Hammerers," as they styled themselves, Ramsay, Aveline, Selwyn, Jukes and other geologists of Wales, along with their contemporaries, the annual dinners of the Survey were events in which a jolly time was spent. Ramsay, in recording Selwyn's presence at a dinner held January, 1851, says: "And, oh! wasn't it a jolly dinner."

In his Memoir of Sir A. C. Ramsay, Sir Archibald Geikie writes p. 66):—"The staff of geological surveyors under Ramsay, besides W. T. Aveline, Trevor E. James, D. H. Williams, and H. W. Bristow, already members of the Ordnance Geological Survey, was now augmented by the appointment of W. H. Bailey and A. R. C. Selwyn—a name which will be frequently mentioned in the course of this Memoir." In a foot-note, the same author writes:—"Alfred R. C. Selwyn, after doing admirable work in the mapping of North Wales, resigned, in July, 1852, to accept the charge of the Geological Survey of Victoria. On the resignation of Sir William Logan, he was appointed Director of the Geological Survey of Canada, an office which he still worthily fills."¹

Sir Archibald mentions the subject of this memorial so often and in so many interesting connexions, that it may not be deemed out of place to refer to a number of the more important ones.

On page 75 is to be found an account of Ramsay's work in South Wales with Selwyn, in the rugged country of Cader Idris. Conjoint work was done by them in later years in the complicated volcanic geology of North Wales. On p. 79 he points out the work around Dolgelli, whilst a full-page portrait of Selwyn is given in a plate facing page 80, which portrait represents him during his official connexion with the Victoria Geological Survey. The photo was taken by Perry, of Melbourne.

Farther on, p. 105, we learn that Selwyn, Jukes, Smyth, and Gibbs, along with Ramsay, held a consultation "over some trappy specimens . . . to look at Jukes's ash-beds." Later (p. 108) we find Selwyn again with Ramsay at Ffestiniog, and over a good deal of the ground around that region, where several problems had arisen in the course of the mapping. On the 8th of June, Ramsay entered the following notes in his diary:—"Up again to the hills south-west of Craigy Cae. Got in some faults and a lot of strange dykes and squirted traps. Selwyn and I separated and took different ground, and often met again to compare and compile." Sir Andrew writes in his diary for October 11th:—"While at work on the side of Crib Goch I heard Selwyn's shrill

¹ The Memoir was written Sept., 1894.

shout, and soon discovered him on the top of a crag on Crib Goch. So we joined and compared notes, and soon put matters straight at Glas Lyn. We passed on to the top, often standing to discuss, and just as we got to the bottom, descried our party coming down."

On page 137 we find that on the 3rd of August, 1848, Selwyn made the ascent of Snowdon in company of Reeks and Smyth. On p. 153 we find Selwyn, having completed his survey of the ground lying between the Snowdon range on the north and Ffestiniog and Tremadoc on the south, went on to work in the Llyn peninsula from Pwllheli. He also worked in the vicinity of Capel Curig, and was wont to be met there by Ramsay himself. In December of the same year Selwyn joined the Director-General and Jukes at Trefriw, having come from Clynog Fawr. Ramsay adds that they joked and had fun all night.

These incidents and many others which might be cited from the interesting work by Sir Archibald Geikie on the life of Ramsay serve to show what intimacy and friendships existed amongst those pioneers in geology, who were conscious of the undoubted close relationship which should exist if good and substantial work was to be accomplished in the difficult region of Wales as well as elsewhere.

WORK IN AUSTRALIA.

In 1852, before completing the whole task of mapping the regions examined by him in England and Wales, Selwyn took unto himself a wife, as had also many of his colleagues, marrying Matilda Charlotte, daughter of the Reverend Edward Selwyn, rector of Hemmingford Abbots, Hunts, and in the following year he was appointed by the Colonial Office, Director of the Geological Survey of the newly formed colony of Victoria, Australia, which had come into great prominence owing to its wonderful gold fields.

His training in the older palæozoics or Cambrian rocks of Wales was of special value to him in the new colony, and accordingly he set himself to the task of mapping out the gold bearing rocks and auriferous gravels of the different ages, and in tracing their relation to other rocks of the district.

Here he had a field of work nearly twelve times greater than he had in Wales; Victoria, the smallest of the Australian colonies, having an area of 87,884 square miles, whilst Wales had a total area of 7,378 square miles only.

In Australia Selwyn was ably assisted by Messrs. C. S. Wilkinson, H. Y. L. Brown, Robert Etheridge, Jr., and other geologists. Besides an extensive series of geologically coloured maps of Victoria, and offi-

cial reports, Selwyn prepared the following reports and papers bearing more especially on the economic resources of Australasia:

"On the Geology and Mineralogy of Mount Alexander and the adjacent country lying between the rivers Lodden and Campaspe." Quar. Jour. Geol. Soc., Vol. X, pp. 298-303, 1854, London.

"Report on the Geological relations of some of the coal seams of Van Diemen's Land, their probable extent and relative economic value." Van Diemen's Land Royal Society papers, III, pp. 116-141, 1855-1859.

"On the Geology of the Gold Fields of Victoria." Quar. Jour. Geological Soc., Vol. XIV, pp. 533-38, London, 1858, and Geologist, Vol. I, pp. 163-4, 1858.

"Notes on the Geology of Victoria." Quar. Jour. Geol. Soc., Vol. XVI, pp. 145-50, 1860.

"Geological Notes of a Journey in Australia from Cape Jervis to Mount Serle." Proc. Geogr. Soc., Vol. V, pp. 242-44, 1861.

"Report on the Auriferous Drifts and Quartz-reefs of Victoria; Observations as to the Probable Age of the lower Gold Drifts." Published in Victoria, Australia, May 4th, 1866. Reprinted in Geological Magazine, Vol. III, pp. 457-59, London, Eng., 1866.

While in Victoria he added much to the knowledge of the gold bearing rocks of that country and also aided in tracing the relation of the Miocene Tertiary strata so rich in Eocene mollusca.

Among the interesting collections made by Dr. Selwyn in Victoria may be mentioned that now deposited in the museum of the Geological Society of London, Burlington House, consisting of tertiary shells from the Murray River.¹ He was continuously engaged as the Director of the Geological Survey of Victoria from 1852 to 1869, a period of nearly seventeen years, and he resigned when the legislature refused to vote the necessary funds to carry on the work.

Under Dr. Selwyn no less than sixty-one geological maps were issued by the Geological Survey of the Colony of Victoria, besides a number of sections to accompany the maps and reports. There may have been many more published, but the above number was obtained from the folio of Geological Maps issued by the Department of Mines and Geology of Victoria during Selwyn's tenure of office as government geologist, which folio is now deposited with the Cartographer of the Geological Survey of Ottawa, to whom I am indebted for information obtained therefrom.

¹ The collections of the Geological Society of London are now being transferred to the Geological Department of the British Museum (Natural History) of South Kensington.

SELWYN'S WORK IN CANADA.

It was on the first day of December 1869, that Selwyn took charge of the Geological Survey of Canada, which had from its inception, in 1841, been carried on by Sir W. E. Logan. Selwyn had arrived in Canada in October of the same year, and vigorously set himself to the task of studying and revising the reports which had been received from the various assistants, who included the following well known geologists:—Sir Wm. E. Logan, Edward Hartley, T. Sterry Hunt, Robert Bell, James Richardson, Charles Robb, and H. G. Vennor. Besides the above, Robert Barlow and his son, Scott Barlow, had charge of the topographical and cartographical part of the Survey, whilst Elkanah Billings was the palæontologist, with Messrs Horace Smith and Thomas C. Weston as assistants, one an artist, and the other in charge of the museum work, skilled lapidary, préparateur, etc.

When Selwyn became Director of the Geological Survey of Canada and deputy head of the same, the confederation of some of the British Provinces had only just been effected, and accordingly there was now open to him a much wider field of investigation than to his predecessor. As one after another the different provinces became part and parcel of the Dominion of Canada the work increased correspondingly, and to such an extent was this the case that the staff of geologists and assistants had to be materially increased, and at the same time men had to be trained to pursue the good work of the old *régime*. It can be safely said that the staff of the Geological Survey of Canada has never been, and even now, is altogether inadequate to cope with the immense field open in the mineral resources of Canada as the Dominion is constituted to-day.

This period was one of great activity in the Canadian Survey. The first copies of Logan's large "Map of the Geology of Canada and adjacent parts of United States," prepared for the engraver by Robert Barlow, were received during the first month of Selwyn's administration from Edward Stanford, the publisher, Charing Cross, London.

As an instance of the great activity and energy displayed by the second director of the Geological Survey of Canada at the outset of his career in Canada, it may be remarked that he not only proposed to Hon. Joseph Howe, as Minister or Head of the Department under which the Geological Survey of Canada was placed, various points bearing on the usefulness of a geological survey from a practical standpoint, but also presented the annual "Summary" report of the geological investigations made by the staff during the previous year.

He further impressed upon the government the advisability of placing a special appropriation in the estimates of the year for the distribution of Logan's large map just received, submitting at the same time a list of public institutions, libraries, etc., where the said map would do a great deal of good to Canada.

In 1870 he investigated the gold fields of Nova Scotia and prepared an important report giving the result of his work there. (See "Report of Progress, Geol. Surv. Canada, 1870-71," pp. 352-82, Ottawa, 1870)

In the following year, under special instructions from Hon. Joseph Howe, he undertook an exploration in the remote province of British Columbia, "on and in proximity to the several lines which will be explained by the engineering parties (of which Mr. Fleming, now Sir Sandford Fleming, was engineer-in-chief), and on one or the other of which the future Pacific Railroad will be located." In the "Report of Progress," 1871-72, is given an account of the results achieved during these explorations. The route selected by Selwyn took him from Hope on the Fraser via Fort Colville, the Kootenay river and the Columbia to the Howse pass, and afforded facilities for returning later by wagon road, 378 miles, from Cariboo to Yale. Not only the coal fields, gold fields and other occurrences of economic value, but timber, soil, water power, agricultural and numerous other features of special value and interest were also recorded, together with systematic descriptions of the various geological formations met and their relation to one another in the stratigraphical series, from the oldest up.

Then, in 1872, we find him journeying from Lake Superior to Fort Garry (now Winnipeg) and in the "Report of Progress," 1872-73, we find no less than three special reports on the silver mining localities of Thunder Bay, on the geological investigations from Lake Superior to Fort Garry and on the Acadia iron ore deposits. In the following "Report of Progress" he gives the result of his investigations on the geological exploration in the Northwest Territories from Fort Garry to Rocky Mountain House. (Loc. cit., pp. 17-62).

In the following year Dr. Selwyn remained for the most part of the year in the office, attending to the numerous and onerous duties incumbent upon him as director, and preparing for the extra work imposed upon him in connection with the Canadian exhibit at the Centennial Exhibition held in Philadelphia. In the Report of Progress, 1875-76, pp. 28-31, he gives the summary of his own explorations in British Columbia, and on pp. 31-69 presents his "Journal of the Expedition through the Peace River Pass." On pp. 292-293 he adds an important note on a boring made in 1875 on the Swan River, in the territory now within the Province of Manitoba. He also prepared a

map of the region from Quesnel, British Columbia, to the junction of the Peace and Smoky rivers. In 1876-77 (Report of Progress for those years), "Notes on the Quebec Group" appear, a subject to which he gave considerable attention, and in which he did much to differentiate from that series those rock formations of volcanic origin. In the report of 1877-78, pp. 1-5, further notes are given "On the Stratigraphy of the Quebec Group" (of Logan) and older crystalline rocks of Canada. This is said to be one of the best attempts ever made at a systematic classification of the most ancient and difficult rock masses. The following year's report (1878-79), Selwyn's work in the Eastern Townships and other portions of Quebec is given, and a "Note on the origin of granite treated as metamorphosed strata, not intrusions" occurs in the Report of Progress for 1879-80, pp. 5-6. The same report contains also an account of boring operations in the Souris Valley in Assiniboia (pp. 1-11). On pp. 51-55a, The fossil plants collected by Dr. A. R. C. Selwyn at Roche Percée and determined by Sir J. W. Dawson are recorded and described. His work on Lake Superior Region during 1882 is embodied in the report for 1880-82, pp. 16-17, together with a report on an exploration in Manitoba during the same year on the White Mud and Souris rivers.

"On the geological nomenclature and colouring and notation of maps" forms the topic of an important contribution from his pen, pp. 47-51, of the "Report of Progress" for 1888, followed by additional notes on the geology of the southeastern portion of Quebec, pp. 1-7a and followed later in the report by a note on the accuracy of the plan of the mouth of the Moose river surveyed by R. Bell in 1883-84, besides a summary of the work of Selwyn during 1883 on Lake Superior, on the Souris coal district in Assiniboia and in the Cascade coal basin of British Columbia.

GENERAL VIEW.

Selwyn leaves behind him a career full of usefulness to the Empire. His work was truly of an Imperial nature, for it extended not only into various portions of Great Britain, but also of the distant colonies of the Mother Country, to the Island Continent of Australia and to the Dominion of Canada. For nearly eight years (1845-52) he laboured diligently in England and Wales, for seventeen years (1852-1869) he carried on geological investigation in Victoria, and spent twenty-five years additional in Canada, thus completing in December, 1894, half a century of active geological work. He was not a voluminous writer for publication, but he was an excellent letter writer. He never spared himself

in attending to the numerous letters which the correspondence branch of the Geological Survey presented. He did much to give the department the good name it has acquired, and for which it has been so favourably known as a bureau of exact information on a thousand and one things of special interest and value to prospectors and investors in all the provinces of the Dominion, as well as in some of the remotest corners of our country.

There is little doubt that the state of efficiency of the Canadian Survey grew apace with Selwyn. Having had for many years closely associated with him as chief advisor and assistant the late and lamented Dr. George M. Dawson, Selwyn led the ship through thick and thin successfully. It cannot be denied that it was under Dr. Selwyn that the Survey reached the height of its career and efficiency in carrying out the objects and aims for which it was instituted.

Nevertheless, it must not be understood that there were no difficulties to overcome, or swords to cross in the long period during which he was Director.

Selwyn's aim from the first was to make the Geological Survey of Canada an eminently practical department in which the records of mines and mineral statistics would be kept for the use and information of parliament and the public. Accordingly, it was with satisfaction that we find him in the second month of his term of office (January, 1870), busily engaged in organizing a branch of the Geological Survey for the purpose of collecting "Reports of Mines and of Mining statistics of the production and consumption of minerals in the Dominion." The decision he arrived at was published in the official "Canada Gazette," and Messrs. Robert Hartley and Robert Bell were requested to undertake the collection and arrangement of the returns made from year to year.

The inadequacy of the buildings then at the disposal of the survey was a point on which Dr. Selwyn repeatedly dwelt, and a larger amount of space necessary for the proper illustration and exhibition of the minerals, resources and industries of the different provinces was repeatedly urged by him.

His first "Report" is addressed to the Hon. Joseph Howe, M.P., Secretary of State for the Provinces, and in it Dr. Selwyn points out the practicability of the establishment of a School of Mines in connection with the Geological Survey.

PRESIDENTIAL ADDRESS.

The following passage, taken from Dr. Selwyn's inaugural address as president of the section of geological and biological sciences, of the Royal Society of Canada, delivered May 25th, 1882, gives an excellent idea of the high minded spirit and love of science to which he was devoting his life and energies. In dealing with the general scientific work in new countries and the "constant struggle for life" which scientists have to encounter, he writes:—"In spite, however, of these difficulties, Canadian geologists have succeeded in obtaining and holding a recognized and highly honourable position in the scientific world. It is needless to dwell on the history and details of the struggle which has achieved this result and which you all, with others now no more, have nobly shared. It behooves us, however, and especially the younger members of the corps, to remember that the fight is not ended, that, as in the past, so in the future, the struggle will have to be maintained. But if this Society, so auspiciously inaugurated, effects that much needed concentration, and consolidation of the efforts of the hitherto scattered combatants, uniting them in one solid phalanx, we may feel assured that the struggle of the future will be far less arduous than the struggle of the past. More especially will this be so if we never for a moment forget that the only object of scientific inquiry is truth. That the soul and life of this search in which we all engage consists in the fresh interchange of thoughts and love of full and complete investigation, with fair and open discussion, unbiased by and irrespective of all personal considerations and based not on the theory, but on earnestly stated and carefully observed facts. Such evidence treated in the spirit I have indicated, certainly will lead us to the truth, but we must always guard against confounding it, as has too often been done, with ingenious theory and dogmatic assertion, because these, however clever, or eloquently supported they may be, are almost certain to lead us in a direction the very opposite to that in which we should travel. For similar reasons partizanship, however commendable and necessary in the political arena, should never be admitted to the domain of science. Bearing these principles in mind, and above all, that unity is strength, I trust that the members of the geological section of the Canadian Royal Society, will henceforth be brethren of the hammer not in name only, but in very act and deed; that they will at all times cordially co-operate with and assist each other in friendly emulation in the work they have in hand, that of elucidating the geological history, physical and biological, of this great country in which the harvest, waiting to be gathered

from the rocks, is so great, but unfortunately the labourers are as yet so few."

First and foremost Selwyn was a stratigraphical geologist and an able one. He was a firm believer in the field characters exhibited by the various series of sedimentary strata in the succession of geological formations in the earth's crust, and also by the volcanic materials which, in many instances, make up some of them, or penetrate the same.

He had a special attraction for those regions where the geological structure was complex, and more especially was this the case as regards the Eastern Townships of Quebec, for, not only during his twenty-five years of office did he take an active part in the examination and elucidation of one of the most difficult and perplexing problems in geology and in the discussion attending the same, but even after his retirement, he was wont to come back to the Survey, and to the former members of his staff would present his views in that bold and vigorous manner so characteristic of him. The volcanics of the Eastern Townships and their associated formations afforded an attractive topic for discussion of the highest order. The result of his own field work led him to interpret the geological structure of that part of Canada in a manner hitherto unknown on this continent. In the Lake Superior region, likewise, Dr. Selwyn delighted to go and carried on geological investigations whenever the duties of the office would permit him to leave the desk for the field.

His keen interest in the "Quebec Group" controversy, in which Logan, Billings, Hunt, Emmons, Sir Wm. Dawson, Hall, Walcott, Ford, Ells, Marcou and many others took a prominent part, was ever kept alive by the fires which arose in the discussion of the numerous knotty points in connection therewith. Selwyn's interpretation of the geological structure of so-called "unfossiliferous Quebec Group" seemed a revelation to practical geologists and gave the key to the solution of at least one important side of the controversy. He thus materially contributed to the advancement of our knowledge of that intricate field by separating the volcanic belts and recognizing the anticlinal structure which it exhibited in contradistinction to the synclinal theory which was held for many years.

Like his predecessor in office Dr. Selwyn was always a strong supporter of the Geological Survey Museum, not only as an important factor in the interests of the country, but also as an educator. The wisdom of moving from Montreal to Ottawa during his term of office was very soon demonstrated in the numbers who registered and came to it from day to day. The inadequacy of the building and its total unfitness, not only for geological work pertaining to the department.

but also for exhibition purposes, were time and again emphasized by him, and it is no doubt owing to his determination and energy that plans have been prepared for a national museum and practical steps taken towards the erection of a building worthy of the country.

In 1884 a committee of the House of Commons was appointed to investigate the work of the Geological Survey of Canada. The evidence of personal animus displayed by Selwyn's antagonists in the progress of the investigation contrasted with the excellent work that had been done by the Survey in the past years, what was being done at the time of the investigation, led the government to further strengthen the hands of the Director, and recommended the establishment of a division of mines and mineral statistics, much in the lines laid down by Dr. Selwyn himself in 1870, but which, for reasons not stated, had not been effectively carried out as expected.

Mount Selwyn in the Peace River Pass; Selwyn Inlet in the Queen Charlotte Islands; Selwyn river, Cranberry river, British Columbia, which enters the Fraser river below Tête Jaune Cache, Selwyn range, in Yukon Territory, are names of places called after the subject of this sketch, and serve to perpetuate his name in the geography of the country where his activities kept him for a quarter of a century.

The following are some of the species of fossil remains which have been named in his honour by various palæontologists in Britain, Australia and in Canada:—*Neuropteris Selwyni*, Dawson; *Cœnites Selwyni*, Nicholson; *Ammonites Selwynianus*, Whiteaves; *Leperditia Selwyni*, Jones; *Cercopis Selwyni*, Seudder; *Menodus Selwyni*, Cope; *Lingulella Selwyni*, Matthew; *Balanophyllia Selwyni*, Duncan; *Orthoceras Selwyni*, Billings; *Prasopora Selwyni*, Nicholson; *Cypræa* (?) *Selwyni*, McCoy; *Trachodon Selwyni*, Lambe; *Goniograptus Selwyni*, mihi.

Selwyn received many honours in his day. Besides occupying many official and responsible positions appertaining to his office as head of the Geological Survey of Canada in the different international exhibitions, which entailed a great deal of executive ability and work, he was created a C. M. G. (Companion of the Order of St. Michael and St. George) by her most Gracious Majesty Queen Victoria, who conferred the honour upon him in person, Selwyn having been summoned to appear at Windsor Castle during the summer of 1886. He was elected a Fellow of the Royal Society of England, was one of the original Fellows of the Royal Society of Canada, founded by the Marquis of Lorne, now Duke of Argyll, was President of Section IV. in 1882, and was elected to the presidency of that Society in 1896.

He also received the medal of the "Acclimatization Society" of Melbourne, Australia, 1881. He received the degree of Doctor of Laws



(LL.D.) from McGill University, Montreal in 1881 for his distinguished services in the field of geology, and was President of the Natural History Society of Montreal in the days when the Canadian Survey was located in that city.

In preparing this account of the life and work of our late lamented "chief" the writer desires to acknowledge his indebtedness to Dr. Henry Woodward, F.R.S., etc. for his able article on Dr. Selwyn, published in the February number of the Geological Magazine for 1899 as one of the series of original articles on "Eminent Living Geologists." He quoted largely from this source; also from the list of publications issued by the Royal Societies of England and Canada, and from N. H. Barton's valuable "Index" of publications on geology of North America, and to Monsieur Michel Mourlon's "Bibliographia Geologica."

In the office Selwyn was a strict disciplinarian. He loved order and system as well as courtesy, and expected from the men under him the deference due to superior officers, such as is the custom in the old world. Brevity and neatness, seemed to be two of his leading characteristics, and in the maps, reports and work that he received from the staff he expected the same. The more stern and official side of his nature was in marked contrast with the sociable, amiable and chivalrous side which characterized him in his own home, in private and in public gatherings, where he always shone and appeared to special advantage.

He was tall and graceful, quick and alert, of a rather high strung and nervous disposition, with a keen and observant eye, capable of grasping the situation at a glance in any emergency. He was economical in his habits; whilst he was not one of those who bestowed many encomiums, nevertheless he duly appreciated work of a high order.

Selwyn was an English scholar of rare ability. His writings, both public and private, are masterpieces of English composition, and the time and care that he bestowed upon the various reports sent in for publication added much to their value and elegance whilst it added much to his labours also, which task might well have been entrusted to an editorial staff had the appropriations allowed.

Amongst his chief works may be mentioned:—"The Dominion and Newfoundland," being Part II of Edward Stanford's "Compendium of Geography and Travel," a work after Hellwald's "Die Erde und ihre Völker," published in 1883; "Descriptive Sketch of Geography and Geology of the Dominion of Canada to accompany the Wall Map of the Geology of Canada," No. 411, in 1884; Notes and Observations in the Gold Fields of Quebec and Nova Scotia; Report of Progress, Geological Survey of Canada, 1870-71, Montreal, 1872.

Appended to this sketch of his life is given the list of his writings, together with an enumeration of the geological maps which were issued under his direction in Australia. For further information regarding the large amount of material prepared and edited by him while in Canada, the reader is referred to the lists of publications issued from time to time by the Librarian of the Geological Survey during Dr. Selwyn's term of office and in later years.

BIBLIOGRAPHY.

1848.

Sketch of the country extending from Cader Idris to Moel. Siabod, North Wales.
Quart. Journ. Geol. Soc., Vol. IV, 1848, pp. 300-302, London, Eng., prepared conjointly with J. Beetes Jukes.

1854.

On the geology and mineralogy of Mount Alexander and the adjacent country lying between the rivers Loddon and Campaspe. Quart. Journ. Geol. Soc., Vol. X (1854), pp. 209-303, London, Eng.

1858.

On the geology of the Gold Fields of Victoria. Quart. Jour. Geol. Soc., Vol. XIV (1858), pp. 533-538, and Geologist, Vol. I, 1858, pp. 163-163.

1859.

Report on the geological relations of some of the coal seams of Van Diemen's Land, Royal Soc. Papers, III, 1855-59, pp. 116-141.

1860.

Notes on the geology of Victoria. Quart. Journ. Geol. Soc., Vol. XVI, pp. 145-150, 1860.

Geological notes of a journey in South Australia from Cape Jervis to Mount Serle. Geogr. Soc. Proc., Vol. V (1861), pp. 242-244.

1866.

Report on the Auriferous Drifts and Quartz reefs of Victoria. Observations on the probable age of the "lower gold drifts," Victoria, Australia, May 4th, 1866. Reprinted in Geol. Mag., Vol. III (1866), pp. 457-459.

(Selwyn and Ulrich). Geology and Mineralogy of Victoria, Svo., 91 pp., 4 plates, one geological map, Melbourne.

1870.

Summary report of investigations dated 7th May, 1870. Geol. Surv. of Canada, pp. 1-14. Printed by order of Parliament, 1870, Ottawa.

1872.

Notes and observations on gold fields of Quebec and Nova Scotia, Geol. Surv. Can. Report of Progress, 1870-71, pp. 252-282, 1872.

On the discovery of reptilian footprints in Nova Scotia, Geol. Mag., Vol. IX., 1872, pp. 250-251, London, Eng.

Report on British Columbia, Geological Survey of Canada, Report of Prog., 1871-72, pp. 16-72, Montreal, 1872. Including analyses by T. S. Hunt.

Summary report of geological investigations, Geol. Sur. Can., Report of Progress, 1870-71, pp. 1-11 (with additional page), 1872.

Summary Report of Geological investigations, Geol. Sur. Can., Rep. Progress, 1871-72, pp. 11-15.

Journal and Report of preliminary explorations in British Columbia. Geol. Surv. Can., Rep. Progress, 1871-72, pp. 16-72, Montreal. 1872.

1873.

- Summary Report of geological investigations by A. R. C. Selwyn, addressed to the Hon. Joseph Howe, M.P., Secretary of State for the provinces, Geol. Surv. Can., Report of Progress, 1872-73, pp. 1-7, Montreal, 1873.
- Report upon the Acadia iron ore deposits of Londonderry, Colchester County, Nova Scotia, Geol. Surv. Can., Report of Progress, 1872-73, pp. 19-31, Montreal, 1873, map.
- Summary Report of Geological investigations. Geol. Surv. Can., Rep. Prog., 1872-73, pp. 1-7, Montreal, 1873.
- Notes on a preliminary geological reconnaissance from Lake Superior to the Winnipeg and English Rivers and to Fort Garry. Geol. Surv. Can.; Rep. of Prog., 1872-73, pp. 8-18, Montreal.
- Abstract: Am. Journal Sci., 3rd series, Vol. VII, pp. 517-518, 1874.

1874.

- Summary Report of geological investigations, Geol. Surv. Can., Rep. Progress, 1873-74, pp. 1-9, 1874.
- Observations in the North West Territory on a journey across the plains from Fort Garry to the Mountain House, returning by the Saskatchewan River and Lake Winnipég. Geol. Surv. Can. Report of Progress, 1873-74, pp. 17-62, 1874 (illustrated).

1875.

- Age of lignitic coal formation of Vancouver Island. Am. Jour., Sci., 3rd series, Vol. 9, p. 318 ($\frac{1}{4}$ p.), 1875.
- Notes on a journey through the Northwest Territories from Manitoba to Rocky Mountain House (1874), Can. Nat & Quart. Jour. of Sci., Vol. VII, pp. 193-216, 1875, Montreal, Can.

1876.

- Summary Report of geological investigations, Geol. Surv. of Can., Report of Progress, 1874-1875, pp. 1-23, 1876.
- Huronian of Canada, Am. Jour., Sci., 3rd series, Vol. 12, p. 461 ($\frac{1}{2}$ p.), 1876.
- Descriptive Catalogue of the collection of the economic minerals of Canada and notes on a stratigraphical collection of rocks. Philadelphia International Exhibition, 1876, pp. 152, Montreal, 1876.

1877.

- Report on the exploration in British Columbia in 1875. Geol. Surv. of Can., Rep. of Prog., 1875-76, pp. 28-86, map, 1877.
- Summary Report of Geological investigations addressed to the Hon. David Laird, M.P., Minister of the Interior, Rep. of Prog. Geol. Sur. Can., 1875-76, pp. 1-7 (1876). Published by authority of Parliament, Montreal, 1877.

1878.

- Summary Report of Geological investigations, 1876-77, addressed to Hon. David Mills, M.P., Minister of Interior, pp. 1-8, 1878. Published by authority of Parliament, Montreal.

1879.

Report of observations on the stratigraphy of the Quebec Group and the older crystalline rocks of the Geol. Surv. of Can., Report of Progress, 1877-78, pp. 1A-15A, Montreal, 1879. Reviewed (J. D. Dana) Am. Jour. Sci., 3rd series, Vol. 18, pp. 481-483, 1879.

Summary Reports of the operations of the Geological Corps to 31st of December, 1878. Report of Progress 1877-78, pp. 1-9, published by authority of Parliament, 1879.

1880.

Summary Report of the Geological Corps to 31st of December, 1879, by Alfred R. C. Selwyn, Director of the Geological and Natural History Surveys of Canada, Report of Progress, 1878-79 (1880), published by authority of Parliament, Montreal, Quebec.

1881.

The stratigraphy of the Quebec Group and the older crystalline rocks of Canada, Canadian Naturalist, Vol. IX, new series, pp. 17-31, 1881. Reviewed by T. McFarlane, pp. 91-102.

Report on the boring operations in the Souris River Valley, Geol. Surv. Can., Report of Prog., 1879-90, pp. 1A-11A, Montreal, 1881, Abstract Phil. Mag. (L. E. & D.), new series, Vol. XIV, p. 71 ($\frac{1}{4}$ p.), 1881. ($\frac{1}{2}$ p), 1881.

Summary Report of the operations of the Geological Corps, to 31st December, 1880, by A. R. C. Selwyn, Director of the Geological and Natural History Surveys of Canada, Geological and Natural History Survey, Report of Progress, 1879-1880, pp. 1-9, published by authority of Parliament, Montreal, 1881.

1882.

On the Geology of the Ottawa palæozoic Basin, Trans. No. 3, Ottawa Field-Nat. Club, pp. 34-39, Ottawa, 1881.

1883.

On the Quebec Group in geology, Trans. Roy. Soc. Can, Vol. I, Sec. 4, pp. 1-14, 4to, Montreal, 1883.

North America: Stanford's Compendium of Geography and Travel, based on Hellward's "Die Erde und ihre Volker." Maps and illustrations, 652 pages, London, Edward Stanford, 55 Charing Cross, 1883. Parts 1 and 2. (Part 2, the Dominion of Canada and Newfoundland, by A. R. C. Selwyn, F.R.S., pp. 298-636). Part 1, by F. V. Hayden, on United States of America.

Notes on the geology of the southeastern portion of the province of Quebec, Geol. and Nat. Hist. Surv. of Can., Report of Progress, 1880-82, pp. 1A-7A, Montreal, 1883.

Geological nomenclature and the colouring and notation of geological maps, Geol. and Nat. Hist. Surv. of Can., Report of Progress, 1880-82, pp. 47-51, Montreal, 1883.

On the geology of Lake Superior, Roy. Soc. Trans., Vol. I, Section 4, pp. 117-122, 4to., 1883.

Age of Rocks on the northern side of Lake Superior, Science, Vol. 1, p. 11 (²/₃p.), 1883. Reviewed by R. D. Irving, pp. 139-140, and by T. S. Hunt, pp. 218-219.

Summary Reports of the operations of the Geological Survey Corps, to December 31st, 1882, by A. R. C. Selwyn, Director of the Geological and Natural History Surv. of Can. (1881), pp. 1-12 (1882), 12-29, published by authority of Parliament, Montreal, 1883.

1884.

Descriptive Sketch of the Geography and geology of the Dominion of Canada, to accompany a new Geological Map (Map No. 411), prepared conjointly with Dr. G. M. Dawson, Geol. Surv. Can. (separate), Large 8vo., 55 pp.

The copper bearing rocks of Lake Superior, Science, Vol. 1, p. 221 (¹/₂ p.), 1883.

Review of R. D. Irving, pp. 140-41. Reviewed by R. D. Irving, pp. 359-60.

(Eastern Section). Descriptive Sketch of the physical geography and geology of the Dominion of Canada, pp. 5-26, map, Montreal, 1884. Abstract Science, Vol. V., pp. 156-57 (4-5 p.), 1884.

Notes on observations, 1883, on the geology of the north shore of Lake Superior (Abstract), Roy. Soc. Can., Trans., Vol. II, Sec. 4, p. 245, 4to., 1885.

Abstracts, Science, Vol. III, p. 675, 1884, Can. Rec. Sci., Vol. I, pages 13-14, 1884.

1885.

On the glacial origin of lake basins, British assoc., Report of 54th meeting, pp. 721-22, 1885.

Geological and Natural History Survey of Canada, Annual Report, new series, Vol. 1, 1885, 733 pages, map, Montreal, 1886. Administrative Reports by G. M. Dawson, McConnell, Low, Bell, Ellis, L. W. Bailey and Chalmers on geology. Cope on paleontology, Coste on mining law, and Hoffmann on chemical analyses.

Summary Report of the Geological Corps to December 31st, 1883, and observations on the work of 1884. Geological and Natural History Survey and Museum of Canada, Report of Progress, 1882-83-84, pp. 1-28, published by authority of Parliament, Dawson Bros., Montreal.

1886.

Summary Report of the operations of the Geological Survey for the years 1884-85 (1884), pp. 1A-36A (1885), pp. 37A-77A.

Geological and Natural History Survey of Canada, Annual Report, new series, Vol. I, 1885, published by authority of Parliament, Montreal, Dawson Bros., 1886.

1887.

The Quebec Group. Science, Vol. IX, pp. 267-68, 1887.

Summary Report of the operations of the Geological Survey for 1886. Geol. and Nat. Hist. Survey Report for 1886. Part A., 87 pages, Montreal, 1887.

1888.

The Huronian of Canada, Am. Geol., Vol. 2, pp. 61-62, 1888.

(Notes on Marcou's paper,* The Taconic of Georgia and the Reports on the Geology of Vermont.) Am. Geol., Vol. II, pp. 134-135, 1888.

Answer to Dr. Persifer Fraser's circular, dated Philadelphia, 9th May, 1887 (On the sub-division of the Archean, and use of the word "Taconic"). International Cong. Geol., Am. Committee Reports, 1888, A, p. 55, 1888. Am. Geol., Vol. 2, p. 207, 1888.

(On the use of the term "Taconic"). International Cong. Geol., Am. Committee Reports, 1888, B, p. 17, 1888. Am. Geol., Vol. 2, p. 207, 1888.

On the facts relating to Eozoon Canadense, Science, Vol. II, p. 146, 1888.

Summary Report of the operations of the Geological Survey for 1888-89. Geol. Surv. Can., Ann. Report, Vol. III, new series, part one, Report A, 117 pages, Montreal, 1888.

1889.

Two Systems confounded in the Huronian, Am. Geol., Vol. III, pp. 339-340, 1889. Canadian Geological Classification for the Province of Quebec, by Jules Marcou, Boston Soc. Nat. Hist. Proc., Vol. 24, pp. 216-18, 1889.

Annual Report for the years 1887-88. Geol. and Nat. Hist. Surv. Can., Vol. III, parts 1 and 2 (includes Director's Report and Reports of staff).

1890.

Tracks of organic origin in the Animikie Group. Am. Jour. Sci., 3rd series, Vol. 39, pp. 145-57, 1890.

Summary Report of the operations of the Geological Survey for the year 1889. Can. Geol. Surv., Ann. Report, Vol. IV, new series, Report A, 66 pages Montreal, 1890.

The Geology of Quebec City, Science, Vol. 16, p. 359, 1890, No. 412, December 26th, 1890.

1891.

(Age of the rocks at Quebec). Bull. Geol. Soc., Am., Vol. 2, p. 501, 1891 (Discussion on H. M. Ami's paper).

Summary Report of the operations of the Geological Survey Department for the year 1890. Printed by order of Parliament. 57 pages. Ottawa, 1891. Reprinted and published as the "Summary Report of the operations of the Geological Survey for 1890, in Ann. Rep. Geol. Surv. Can., Vol. V, Part I, pp. 1A-86A. Ottawa, 1893.

1892.

Summary Report of the Geological Survey for the year 1891. Printed by order of Parliament, 60pp., Ottawa, 1892. Reprinted and published as the "Summary Report of the Geological Survey for the year 1891." Ann. Rep. (n.s.), Vol. 5, pp. 1A-90A, Part 1, Ottawa, 1893.

1893.

Summary Report of the Geological Survey Department for the year 1892. Printed by order of Parliament, 1893. Reprinted and published as "Summary Report of the operations of the Geological Survey of Canada for the year 1892." In Ann. Rep. (n.s.) Vol. VI, 95 pp. (1A-95A), Ottawa, 1895.

1894.

Summary Report of the Geological Survey Department for the year 1893. Printed by order of Parliament. 65 pages, Ottawa, 1894. Reprinted and republished as "Summary Report of the operations of the Geological

Survey for the year 1893," in *Ann. Rep. Geol. Surv. (n.s.)*, Vol. VI, 98 pages, 1A-98A, Ottawa, 1894 (1895). Separates; 1894; whole volume; 1895.

1895.

Bibliography of the members of the Royal Society of Canada by John George Bourinot, Secretary of the Society, pp. 70-71. Presented before the Society, May 25th, 1894, issued 1895.

Following is a list of the "sheets or maps and horizontal sections" prepared in whole or in part by Dr. Selwyn during the years that he was on the staff of Her Majesty's Survey of England and Wales. The maps were published at the Ordnance Office, whilst the horizontal sections were published in the Geological Office, Jermyn Street, London, Eng.

1848.

No. LIX. South East (Machynlleth) scale of one inch to a statute mile, London; 1848. Prepared with A. C. Ramsay and W. W. Smyth.

1850.

No. LXXVI. North (Bardsley) scale of one inch to a mile, London.

No. LXXVI. South (Bardsley) scale of one inch to a statute mile, 1850.

No. LXXVI. Northwest (Harlech) scale of one inch to a statute mile, London, 1850, prepared by A. C. Ramsay.

No. LV. Southwest (Leominster) scale of one inch to a statute mile, prepared by W. T. Aveline.

1851.

No. LXXV. Southwest (Harlech) scale of one inch to a statute mile, London, 1851.

1852.

No. LXXVIII. Southwest (Banger) scale of one inch to a statute mile, London, 1852. Prepared in conjunction with A. C. Ramsay and W. W. Smyth.

No. LXXVIII. Northwest (Banger) scale of one inch to a statute mile, 1852. Prepared in conjunction with Sir Henry de la Beche, W. W. Smyth and A. C. Ramsay.

No. LXXVIII. Southeast (Banger) scale of one inch to a statute mile, London, 1852. Prepared in conjunction with A. C. Ramsay, W. T. Aveline, J. B. Jukes.

Horizontal Sections, Sheet No. 23. Geological Survey of Great Britain. Scale of six inches to one mile, London, 1852. Prepared conjointly with W. T. Aveline.

1853.

Horizontal Sections. Sheet No. 29. Geological Survey of Great Britain. Scale of six inches to one mile, London, 1853. Published at the Geological Survey Office. Prepared conjointly with A. C. Ramsay and W. T. Aveline.

Horizontal Sections. Sheet 28. Geological Survey of Great Britain. Scale, six inches to the mile, London, 1853. Published at the Geological Survey Office. Prepared conjointly with A. C. Ramsay.

No. LXXV. Northeast (Harlech) scale of one inch to a statute mile. Prepared conjointly with A. C. Ramsay, W. T. Aveline and J. B. Jukes, London, 1853.

1854.

Horizontal Sections. Sheet No. 37. Scale, six inches to the mile, Geological Survey of Great Britain. Prepared conjointly with A. C. Ramsay and W. T. Aveline, London, 1854.

Horizontal Section. Sheet 31. Geological Survey of Great Britain. Six inches to the mile, London, 1854. Prepared conjointly with A. C. Ramsay, J. B. Jukes and W. T. Aveline.

1855.

No. LV. Southeast (Leominster) scale, one inch to the mile, London, 1855. Prepared conjointly by J. B. Jukes, W. T. Aveline and H. B. Howell.

No. LXXIII. Northwest (Market Drayton) scale of one inch to a statute mile, Prepared jointly with Edward Hull, London, 1855.

No. LX. Northwest (Montgomery) Geological Survey of Great Britain. Prepared conjointly with J. B. Jukes, W. T. Aveline and A. C. Ramsay, London, 1855.

1857.

No. LXXIII. Northeast (Market Drayton) Geological Survey of England and Wales. Scale of one inch to a statute mile. Prepared conjointly by W. W. Smyth and Edward Hull, London, 1857.

CATALOGUE LIST OF GEOLOGICAL MAPS AND SECTIONS PREPARED UNDER THE DIRECTION AND SUPERVISION OF DR. A. R. C. SELWYN, AS HEAD OF THE GEOLOGICAL SURVEY OF VICTORIA, AUSTRALIA.¹

Sheet, No. 1. N. E. Melbourne Geological Survey of Victoria. Jikajika, Bulleen and Collingwood, surveyed engraved and published under the direction of A. R. C. Selwyn, Government Geologist, Dept. of Public Lands, Victoria; C. D. H. Aplin, Assistant; J. D. Burn, Engraver; J. Williamson, draughtsman. Scale, two inches to a mile (date of publication not given).

Sheet, No. 1. N. W. Melbourne Geological Survey of Victoria; part of Jikajika and Doutt Galla. Published at the Dept. of Crown Lands and Survey; A. R. C. Selwyn, Govt. Surveyor; C. D. H. Aplin, assistant, etc. Scale two inches to one mile (date of publication not given).

Sheet No. 1. S. W. Williamstown. Geological Survey of Victoria. Surveyed engraved and published under the direction of A. R. C. Selwyn, Government Geologist, Dept. of Public Lands, Victoria; C. D. H. Aplin, Asst.; J. D. Brown, engraver; J. Williamson, draughtsman. Scale, two inches to a mile. Trugarina and Cutpawpaw (date of publication not given).

Sheet No. 1. S. E. Melbourne, Geological Survey, Victoria, Broondara and Prahran. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist, Dept. of Public Lands, Victoria; C. D. H. Aplin, Assistant; J. D. Brown, engraver; J. Wilkinson, draughtsman. Scale, 2 inches to a mile (no date of publication given).

¹ This list was prepared from the mounted sheets and maps of Survey of Victoria, bound in Atlas form and deposited with the geographer of the Geological Survey Department at Ottawa.

- Sheet No. 2. N. E. Geological Survey, Victoria, Geologically surveyed by R. Eltheridge, Asst. Field Geologist, 1868, published 1869, under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Scale, two inches to a mile. Part of Morang, Woollert, and Kal Kallo and Yan Yean.
- Sheet No. 2. N. W. Geological Survey, Victoria, Mickleham, Kall Kallo and Yuroke, surveyed in 1846 by N. Taylor; engraved by J. L. Ross, under the direction of A. R. C. Selwyn, Government Geologist, and published at the Dept. of Crown Lands and Survey, Melbourne; Scale, two inches to a mile (No date of publication given).
- Sheet No. 2. S. W. Geological Survey of Victoria, surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Scale, two inches to a mile (Date of publication not given). Part of Bulla Bulla, Will Will Rook, Tuilamarine.
- Sheet No. 3. N - W. Geological Survey of Victoria. Part of Clinton, Wallan Wallan, Geologically surveyed by Norman Taylor, 1857, published 1862, under the direction of A. R. C. Selwyn, Government geologist at the Geological Survey Office, Melbourne; printed at the Mining and Geological Dept. Scale, two inches to the mile.
- Sheet No. 3. N.E. Geological Survey of Victoria, Counties of Bourke, Wallan Wallan, Dalhousie, Anglesey, Evelyn, Toorouroug and Linton. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Dept., Melbourne, published 1865. Geologically surveyed by Norman Taylor, 1858. Scale, two inches to a mile.
- Sheet No. 3. S.E. Geological Survey of Victoria, Merriang, Kal Kallo, Toorouroug, Yan Yean; geologically surveyed by Norman Taylor, 1857, published 1864, under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne, printed at the mining and Geological Department.
- Sheet No. 3. S. W. Geological Survey of Victoria, parts of Darraweit Guim and Merriang; published at the Geological Survey Office under the direction of A. R. C. Selwyn, Government Geologist; Norman Taylor, field geologist, Melbourne, 1862. Scale, two inches to one mile.
- Sheet No. 4. S. W. Geological Survey of Victoria, parts of Moranding, Glenburnie, Chintin and Bylands, surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological survey office, Melbourne, Assistant, Norman Taylor; Fredrick McCoy, palaeontologist (date of publication not given).
- Sheet No. 5. N. W. Parts of Baynton, Carlsruhe, Lancefield and Lansley, geologically and topographically surveyed by Norman Taylor, Field Geologist, under the direction of A. R. C. Selwyn, Government Geologist, the Government Geologist of ice at Melbourne, published in 1861. Printed at the Geological Dept. (County of Dalhousie).
- Sheet No. 5. S. W. Geological Survey of Victoria, parts of Cobaw, Lancefield and Woodend, under the direction of A. R. C. Selwyn, Government Geologist, at the Geological Survey Office, Melbourne; Norman Taylor, assistant (Date of publication not given). Scale, two inches to the mile.

- Sheet No. 5. S.E. Geological Survey of Victoria, parts of Lancefield, Springfield, Forbes, Rochford; surveyed, engraved and published under the direction of A. R. C. Selwyn, Geologist at the Geological Survey Office, Melbourne; Norman Taylor, assistant; executed by the Geological Survey Dept. at the Government Printing Office, Melbourne. Scale, two inches to the mile.
- Sheet No. 6. N. W. Geological Survey Victoria, parts of Rochford, Woodrud, Macedon, Newham, Mongetta, Kerrie; surveyed, engraved and published under the direction of A. R. C. Selwyn, Govt. Geol. of the Geological Survey Office at Melbourne; N. Taylor, C. D. H. Aplin, assistants. Scale, two inches to the mile.
- Sheet No. 6. N. E. Geological Survey of Victoria, part of Monegetta, Chintin, Havelock, etc.; surveyed, published, etc., under the direction of A. R. C. Selwyn; Norman Taylor, assistant. Scale, two inches to one mile.
- Sheet No. 6. S.W. Geological Survey of Victoria, parts of Macedon, Bullingarook, Buttlerjork, Kerrie and Gisborne, surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne, C. D. H. Aplin, Assistant (date of publication not given). Scale, two inches to the mile.
- Sheet No. 6. S. E. Geological Survey of Victoria, parts of Kerrie and Havelock; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Survey Office, Melbourne; Norman Taylor, C. D. H. Aplin, Assistant (Date of publication not given). Scale, two inches to the mile.
- Sheet No. 7. S.E. Geological Survey of Victoria, parts of Bulla, Tullamarine, Maribyrnong, Yangardook and Kororoit; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne; C. D. H. Aplin, Assistant (Date of publication not given). Scale, two inches to the mile.
- Sheet No. 8. S. W. Geological Survey of Victoria, parts of Mooradoranook, Bourke, Tarrneit, Grant; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Frederick McCoy, Palaeontologist; Geologically surveyed by Richard Daintree, Field Geologist, 1861. Published 1864. Scale, two inches to a mile.
- Sheet No. 8. S. E. Geological Survey of Victoria, parts of Grant, Werribee, Bourke, Drutzam, Tarrneit and Truganin; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne; geologically surveyed by R. Daintree, field geologist, 1861, published in 1864.
- Sheet No. 7. N.W. Geological Survey of Victoria, parts of Yangardook, Buttlerjork and Holden, surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne; C. D. H. Aplin, Assistant (Date of publication not given). Scale, two inches to the mile.
- Sheet No. 7. N.E. Geological Survey of Victoria, parts of Holden, Mickleham; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne; C. D. H. Aplin, Assistant; Norman Taylor, etc. Scale, two inches to the mile (Date of publication not given).

- Sheet No. 9. N.W. Geological Survey of Victoria, parts of Elphinston, Talbot, Dalhousie, surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Office, Melbourne; geologically and topographically surveyed by G. Ulrich, field geologist, 1859, published 1866. Second edition revised.
- Sheet No. 9. N.E. Geological Survey of Victoria, parts of Edgecombe, Metcalfe, Emberton, Langley, Lauriston and Carlsruhe; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne; George Ulrich, Assistant; Fred. McCoy, Palæontologist. Scale, two inches to a mile (date of publication not given).
- Sheet No. 9. S.W. Geological Survey of Victoria, parts of Fryers, Drummond, Edgecombe, Glenlyn, Holcombe and Burke; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office at Melbourne; C. D. H. Aplin, Assistant, and George Ulrich, Assistant, &c. Printed at the Geological Survey Department. Scale, two inches to a mile (Date of publication not given).
- Sheet No. 9. S.E. Geological Survey of Victoria, parts of Bourke, Carlsruhe and Lauriston, surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne; C. D. H. Aplin and George Ulrich, Assistants. Scale, two inches to the mile (Date of publication not given).
- Sheet No. 10. N.W. Geological Survey of Victoria, parts of Edgecombe, Burke, Glenlyn, Coliban and Trentham; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne; C. D. H. Aplin, Assistant. Scale, two inches to the mile (Date of publication not indicated).
- Sheet No. 10. N. E. Geological Survey of Victoria, parts of Macedon, Tylden, Woodend, Trentham, surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne; C. D. H. Aplin, Assistant. Scale, two inches to the mile (Date of publication not given).
- Sheet No. 12. S.E. Geological Survey of Victoria, parts of Garrocburghap, Parwan, Balliang, Mouyong; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Department Office, Melbourne; Fred. McCoy, Palæontologist; geologically surveyed by Richard Daintree, field geologist, 1863; published 1864. Scale, two inches to a mile.
- Sheet No. 14. Loddon District. N.W. Geological Survey of Victoria; surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically and topographically surveyed by Geo. Ulrich and Henry Brown, field Geologist, 1866-67, published 1868.
- Sheet No. 13. S.E. Geological Survey of Victoria. Geologically and topographically surveyed by Norman Taylor, 1863, published 1866.
- Sheet No. 12. N. E. Geological Survey of Victoria, parts of Garrocburghap and Parwan. Geologically surveyed by R. Daintree and C. S. Wilkinson, field Geologist, 1866, published 1868, under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne.

- Sheet No. 13. N.E. Geological Survey of Victoria, parts of Lyell, Kimbolton, Iangwornor, Glen Hope, Spring Plains. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically surveyed by Norman Taylor, field Geologist, and Robt. Etheridge Jun., Assistant field Geologist, 1865-66, published 1868 (Engraved by Dr. Gruety & Co.). Printed at the Geological Dept., Govt. Ptg. Office, Melbourne. Scale, two inches to the mile.
- Sheet No. 13. S.W. Geological Survey of Victoria, parts of Faraday, Hawkestone, Metcalfe and Chewton. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne; C. D. H. Aplin and Geo. Ulrich, Assistants, etc. Scale, two inches to the mile.
- Sheet No. 14. S.W. Geological Survey of Victoria, parts of Tarrengower, Moolort. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically surveyed by Geo. Ulrich and Henry Brown, Field Geologists, published 1867. Scale, two inches to the mile.
- Sheet No. 14. S.E. Geological Survey of Victoria, parts of Walmer, Chewton, Faraday, Harcourt, Castlemaine and Muckleford. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Office, Melbourne; C. D. H. Aplin and Geo. Ulrich, Assistants. Scale, two inches to a mile. Chromo-lithographed by the Geological Survey Department (Date of publication not given).
- Sheet No. 15. N.E. Geological Survey of Victoria, parts of Muckleford, Castle maine, Chewton, Yandoit, Strangways, Guildford and Fryers. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically surveyed by C. D. H. Aplin and Geo. Ulrich, Field Geologists, published 1864.
- Sheet No. 15. S.E. Geological Survey of Victoria, parts of Fryers, Franklin, Holcombe, Yandoit. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Office, Melbourne. Geologically and topographically surveyed by Geo. Ulrich, Field Geologist, 1861. Published 1866.
- Sheet No. 19. N.E. Geological Survey of Victoria, parts of Anakie, Lara, Balliang, Monyang, Wurdie-Youang. Surveyed, engraved and published under the direction of A. R. C. Selwyn at the Geological Survey Office, Melbourne. Fredrick McCoy, Palaeontologist. Geologically surveyed by Richard Daintree, Field Geologist 1861. Published 1863. Scale two inches to a mile. Printed at the Mining and Geological Department.
- Sheet No. 19. S.E. Geological Survey of Victoria, parts of Anakie, Wurdie-Youang, Moranghurk, Youang, Lara. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Frederick McCoy, Palaeontologist. Geologically surveyed by Richard Daintree, field Geologist, 1861. Published 1863. Scale, two inches to a mile. Printed at the Mining and Geological Department.
- Sheet No. 20. N.W. Geological Survey of Victoria, parts of Mambourin, Wurdie-Youang, Bulban, Cocorock. Surveyed, engraved and published under the

direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Department, Melbourne. Geologically Surveyed by Richard Daintree, Field Geologist, 1861. Published 1863. Scale, two inches to a mile.

Sheet No. 20. N.E. Geological Survey of Victoria, parts of Tarrneit, Truganina, Cocorock, Werribee, Mambourin and Deutgam. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically Surveyed by C. D. H. Aplin, field Geologist, 1861, published 1863. Scale, two inches to a mile. Printed at the Mining and Geological Department.

Sheet No. 20. S. W. Geological Survey of Victoria, parts of Wurdi-Youang, Cocorock, Murteaim and Woornyalook. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Department Office, Melbourne. Fredrick McCoy, Palaeontologist. Geologically surveyed by Richard Daintree, Field Geologist, 1861, assisted by C. S. Wilkinson. Published 1863. Scale, two inches to a mile.

Sheet No. 20. S. E. Geological Survey of Victoria, parts of Cocorock, Murteaim and Deutgam. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Office, Melbourne. Geologically surveyed by C. D. H. Aplin, Field Geologist, 1861. Published 1863. Scale, two inches to a mile.

Sheet No. 21. N.W. Geological Survey of Victoria, parts of Deutgam, Truganina. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Surveyed geologically by C. D'Oyly. C. Aplin, Field Geologist, 1861. Published 1863. Scale, two inches to a mile.

Sheet No. 23. N.W. Geological Survey of Victoria, parts of Woornyalook, Murteaim and Moranshuk. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically Surveyed by R. Daintree, Field Geologist, 1861, assisted by C. S. Wilkinson. Scale, two inches to a mile. Published 1863.

Sheet No. 23. N. E. Geological Survey of Victoria, parts of Bellarine and Paywit. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically surveyed by Richard Daintree, Field Geologist, 1861. Scale, two inches to a mile. Published 1863.

Sheet No. 23. S.W. Geological Survey of Victoria, parts of Moolap and Bellarine. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Fredrick McCoy, Palaeontologist. Geologically surveyed by R. Daintree, Assistant Geologist, 1860. Published 1862. Scale, two inches to a mile.

Sheet No. 23. S.E. Geological Survey of Victoria, parts of Bellarine and Paywit. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Richard Daintree, Field Geologist, 1861. Published 1863. Scale, two inches to a mile.

Sheet No. 24. S.E. Geological Survey of Victoria, parts of Moorpanyal, Gherineghap, Barrarbool, Corio and Conewarre. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically surveyed by R. Daintree, Field Geologist, assisted by C. S. Wilkinson, 1861. Published 1863. Scale, two inches to a mile.

Sheet No. 24. N.E. Geological Survey of Victoria, parts of Woornyalook, Darriwill, Moranghurk, Gherineghap and Moorpanval. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Scale, two inches to a mile. Geologically surveyed by R. Daintree, assisted by C. S. Wilkinson, 1861. Published 1863.

Sheet No. 26. S.E. Geological Survey of Victoria, parts of Bamganie, Coole, Barskurk, Burtwaarrah, Carrah and Shelford E. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically and topographically surveyed by C. S. Wilkinson, and R. Murray, Field Geologist, 1866. Published 1867. Scale, two inches to a mile.

Section No. 1. S. W. Corner Quarter Sheet, 26, southeast Reid's Creek, across the Leigh River.

Section No. 2. N.E. Corner of Quarter Sheet, 26, S.E. (Reid's Creek.)

Sheet No. 28. N. E. Parts of Corio, Barrarbool, Conewarre, Puebla, Paraparab. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically surveyed by R. Daintree, assisted by C. S. Wilkinson. Scale, two inches to a mile. Published 1863.

Sheet No. 28. S.E. Geological Survey of Victoria, parts of Jan Juc, Paraparap and Puebla. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Department Office, Melbourne. Geologically surveyed by R. Daintree, Field Geologist, 1861, assisted by C. S. Wilkinson. Published 1863. Scale, two inches to a mile. Together with illustrations of Miocene, Qutiany cliffs, 14 miles south from Geelong.

Sheet No. 29. N.W. Geological Survey of Victoria, parts of Moolap, Bellarine. Puebla Conewarre. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Department Office, Melbourne. Geologically surveyed by R. Daintree, Field Geologist, 1860. Published 1862. Scale, two inches to a mile.

Sheet No. 29. N.E. Geological Survey of Victoria, parts of Paywit and Bellarine. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Scale, two inches to a mile. Geologically surveyed by R. Daintree, Field Geologist, 1861. Published 1863.

Sheet No. 29. S. W. Geological Survey of Victoria, parts of Conewarre and Puebla. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Geologically surveyed by R. Daintree, Field Geologist, 1861. Published 1863. Scale, two inches to a mile. Printed at the Geological Department.

Sheet No. 51. S.W. Geological Survey of Victoria. Glenhope and Baynton. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Scale, two inches to a mile. Geologically and topographically surveyed by Norman Taylor, Field Geologist, 1865. Published 1866. Printed at the Geological Survey Department.

Section I. From West Margin, Quarter Sheet, 14, N.W. (Bradford.)

Section II. Area Bradford and Creek.

Sections. Quarter Sheet, 12, N.E. (Bacchus Nearh.)

Sheet No. 52. N.E. Geological Survey of Victoria, parts of Eddington, Barrington, Tarrengower, Craigie, Carisbrook and Moolort. Surveyed, engraved and published under the direction of A. R. C. Selwyn, Government Geologist at the Geological Survey Office, Melbourne. Scale, two inches to a mile. Published 1863.

In all the above maps it is clearly seen that the same care, precision and neatness, so characteristic of the Geological Survey of Great Britain were also present, clearly marking Selwyn's influence and work while chief of the Geological Survey of Victoria.

CHRONOLOGICAL DIGEST

1824. Born at Kilmington, Somersetshire, England.

1845. Appointed to the field staff of Her Majesty's Geological Survey of England and Wales.

1845-1852. Period during which Selwyn was attached to the Government Survey.

1852-1869. Period during which Selwyn was in charge of the Geological Survey in Victoria, Australia.

1856. Appointed one of the Victoria Commissioners of Mines.

1858. Selected as a member of the Board of Science of Victoria.

1858. Elected a member of the Board of Science of Victoria.

1858. Elected a member of the Prospecting Board of Victoria.

1861. Appointed Commissioner for the Victoria International Exhibition.

1862. Appointed Commissioner for the London International Exhibition.

1865. Appointed Commissioner for the Dublin Exhibition.

1866. Appointed Commissioner for the Paris Exhibition.

1869. Appointed to succeed Sir Wm. E. Logan as Director of the Geological Survey of Canada, December 1st, 1869.

1871. Elected a Fellow of the Geological Society of London.

1876. In charge of Mineral Exhibit from Canada to Centennial Exhibition, Philadelphia.

1878. In charge of Collections of economic minerals and geology of Canada at the Paris International Exposition, where he was also elected Chairman of the Jury of Cartography.

1878. Made Chevalier de la Légion d'Honneur, Paris.

1881. Received the Honorary degree of Doctor of Laws, McGill University, Montreal.

1882. Selected by the Marquis of Lorne, Governor of Canada, and founder of the Royal Society of Canada as one of the twenty original Fellows of Section IV., Geological and Biological Sciences, and first President of the same.

1884. Received the Clark Gold Medal from the Royal Society of New South Wales.
1886. Appointed Commissioner for the Colonial and Indian Exhibition, held in London, and in charge of the mineral exhibit.
1886. Created a C. M. G. (Companion of the Order of St. Michael and St. George) by Her Most Gracious Majesty Queen Victoria.
1890. Elected Fellow of the Geological Society of America.
1893. Appointed Commissioner for Canada at the World's Fair, Chicago, and selected by the General Committee of the Exposition as one of the Jurors in the Mine Section.
1894. Date of retirement from directorship of Geological Survey of Canada, Dec. 1st, 1894.
1902. Died on Sunday, October 19th, 1902, at his home in Vancouver, British Columbia.

Besides the above he was also elected a Fellow of the Royal Society of England; Fellow of the Royal Imperial Society of Germany; Fellow of the American Philosophical Society of Philadelphia; Honorary member of the Natural History Society of Montreal; Fellow of the Geographical Society of France, Paris; Member of the Industrial Museum, Turin, Italy; and Fellow of the Malacological Society of Belgium, Brussels.

XII.—*Bibliography of Canadian Geology and Palæontology for the Year 1903.*

By H. M. AMI, of the Geological Survey of Canada.

(Read June 23rd, 1904.)

- ADAMS, F. D.—“The Monteregian Hills—a Canadian Petrographical Province.” *Journ. of Geol.*, Vol. XI, No. 3, April-May, 1903, pp. 239-283 (illustr.). Chicago, Ill., U.S.A.
- ADAMS, F. D.—(Geological Structure of the Monteregian Hills.) *Science*, N.S., Vol. XV, No. 391, pp. 1009-1010, June 27th, 1902. New York. (Abstract of paper read before Roy. Soc. Can.), G. U. Hay.
- ADAMS, F. D.—Mémorial of Geo. M. Dawson. *Bull. Geol. Soc. Am.*, Vol. XIII, pp. 497-509 (portrait), Feb., 1903, with bibliography by H. M. Ami, Rochester, N.Y.
- AMI, H. M.—Notes on drillings obtained in six diamond-drill bore-holes in the bed of the Saint Lawrence River at Victoria Cove, Sillery, eight miles above Quebec (illustrated). *Sum. Rep. Geol. Surv. Depart. for 1902*, pp. 326-336; printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- AMI, H. M.—Meso-Carboniferous Age of the Union and Riversdale Formations, Nova Scotia (abstract). *Bull. Geol. Soc. Amer.*, Vol. XIII, pp. 533-535, Feb., 1903.
- AMI, H. M.—Ordovician Succession in Eastern Ontario (abstract). *Bull. Geol. Soc. Amer.*, Vol. XIII, pp. 517-518, Feb., 1903. Rochester, N.Y.
- AMI, H. M.—“Resources of the Country between Quebec and Winnipeg, along the line of the National Transcontinental Railway” (with map). Printed by order of Parliament, 179 pp., S. E. Dawson, King's Printer, Ottawa, 1903.
- AMI, H. M.—“Palæontology and Chronological Geology,” Manitoulin Island District of Ontario, Quebec, Nova Scotia, etc., etc. *Sum. Rep. Geol. Surv. Dept. for 1902*, pp. 317-326; printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- AMI, H. M.—Sketch of the life and work of the late Dr. A. R. C. Selwyn, C.M.G., LL.D., F.R.S., F.G.S., etc., director of the Geological Survey of Canada from 1869 to 1894 (portrait). *Amer. Geol.*, Vol. XXXI, No. 1, Jan., 1903, pp. 1-12 Pl. I.
- AMI, H. M.—Review of Dr. G. F. Matthew's “Additional Notes on the Cambrian of Cape Breton, with descriptions of new species.” *Ex. Bull. Nat. Hist. Soc. N. Br.*, No. XX., 1902. *Geologisches Centralblatt*, Bd. III., No. 2, 15 January, 1903. Leipzig
- AMI, H. M.—Bibliography (of Dr. G. M. Dawson). *Bull. Geol. Soc. Amer.* (Proceedings of the Rochester Meeting.) Vol. XIII, pp. 502-509. Issued March, 1903; (To accompany “Mémorial of George M. Dawson,” by Frank D. Adams.)
- AMI, H. M.—Bibliography of Canadian Geology and Palæontology for 1902. (Read May 19th, 1903.) *Trans. Royal Soc. Can.*, 2nd Ser., Vol. IX, Sec. 4, 1903-4, pp. 173-198.

- AMT, H. M. — "Alfred A. R. C. Selwyn." *Quart. Jour. Geol. Soc., London*, Vol. LIX, Proc. pp. 61-63, 1903.
- AMT, H. M.—"On the Upper Cambrian Age of the Dictyonema Slates of Angus Brook, New Canaan and Kentville, N.S." *Proc. and Strans. Nov. Scot. Inst. Sci.*, Vol. X, pp. 447-450, Halifax, N.S. (Vol. 3, 2nd Dev.) Part 4, session 1901-1902.
- AMT, H.M.—"The First Eparchaeon formation." *Abstract, Science new ser.*, Vol. 17, p. 290, 1903.
- ANON.—Manganese in Nova Scotia. *Can. Min. Rev.*, Vol XXII, No. 10, p. 204, October, 1903. Ottawa, Ont.
- ANON.—"The Rock Slide at Frank." *The Canadian Engineer*, Vol. X, No. 6, pp. 164, 165, 166 (illustrated), June, 1903. Toronto and Montreal.
- ANON.—"Notes on the Sudbury District, Ontario." *Engin. and Mining Journ.*, Vol. LXXVI, No. 6, p. 202. New York City.
- ANON.—Bibliography of the Rocky Mountains and Selkirk Ranges, British Columbia and Alberta." *Appalachia*, Vol. X (1903), pp. 179-186.
- ANON —"Arctic Geology, 'Fram.'" *Nature*, Vol. 68, p. 105, London, Eng., 1903. (see also P. Schei.)
- ASKWITH, W. R.—"The West Gore Antimony Deposits" (illustrated.) *Jour. Mining Soc., Nova Scotia*, Vol. VI, (1900-1901 and 1901-1902), pp. 80-86 (Discussion on same: pp. 87-89.) Halifax, N.S. Received at Ottawa, Feb. 27, 1903.
- BAILEY, L. W.—"Notes on the Highlands of northern New Brunswick." *New Brunswick Nat. His. Soc. Bull. No. 21*, (Vol. 5, pt. 1.) pp. 93-101, 1903.
- BAILEY, L. W.—"Geological Observations in Northern New Brunswick." *Sum. Rep. Geol. Surv. Dept. for 1902*, pp. 382-388. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- BARLOW, ALFRED E.—"The Sudbury Mining District." *Sum. Rep. Geol. Surv. Dept. for 1902*, pp. 252-267. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- BELL, ROBERT.—(The Acting Director's Report). *Summary Report Geological Survey Department*, pp. 1-20 and p. 470. Printed by order of Parliament, S. E. Dawson, Ottawa, 1903.
- BELL, ROBERT.—"Report of the Committee on the Nomenclature of Geological formations in Canada." *Trans. Roy. Soc. Can.*, 2nd Ser., Vol. VIII. Minutes of Proceedings, etc., pp. 39 and 40. Issued Feb. 3rd, 1903.
- BOLTON, L. L.—"Round Lake to Abitibi River." *Rep. Bureau of Mines*, pp. 173-190. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- BONNEY, T. G.—Note on rocks specimens from the Canadian Rocky Mountains. "The Geogr. Journ.," Vol. XXI, No. 5, pp. 498-499, May, 1903.
- BONNEY, T. G.—Notes on Specimens collected by Professor Collic, F.R.S., in the Canadian Rocky Mountains." *Geol. Mag., N.S.*, Dec. 4, Vol X, No. 7, July, 1903, pp. 289-297. London, England. (Illustrated, fig. 1 and pl. 17.)
- BORIGHT, SHERMAN H.—Notes on the Geology of the Northern Portion of the Boisdale Hills Anticline." *Journ. Can. Min. Inst.*, Vol. VI, pp. 441-434 (illustrations, diagrams and maps). Ottawa, March, 1903.

- BOYD, D. G.—"Michipicoton Mining Division." Rep. Bureau of Mines, pp. 62-65. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- BLAKEMORE, W.—The Future of the Coal and Coke Supply of British Columbia. Journ. Can. Min. Inst., Vol. VI, pp. 224-232. Ottawa, March, 1903.
- BRENT, CHARLES.—"Notes on the Gold Ores of Western Ontario." Journ. Can. Min. Inst., Vol. VI, pp. 327-335. Ottawa, March, 1903.
- BREWER, M. E.—"Mineral Resources of Vancouver Island." Journ. Can. Min. Inst., Vol. VI, pp. 188-199. Ottawa, March, 1903.
- BREWER, W. M.—"White Horse District in Yukon Territory—history, geology, present conditions and future prospects of the mining district." Mines and Minerals, Vol. 24, pp. 28-31, 1903.
- BREWER, W. M.—"Mount Sicker mining district, British Columbia." Mining & Sci. Press, Vol. 87, pp. 7-8, 2 figs., 1903.
- BROCK, R. W.—"Preliminary Rep. on the Boundary Creek District, British Columbia. Sum. Rep. Geol. Surv. Dept. pp. 90-136. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- BRUMELL, H. P. H.—Canadian Graphite. Can. Min. Review, Vol. XXII, No. 6, June, 1903, p. 140. Ottawa, Ontario.
- BURROWS, A. G., and J. WALTER WELLS.—"Provincial Assay Office." Rep. Bureau of Mines, pp. 68-72. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- CAMPBELL, ROBERT—Review of H. F. Osborn and L. M. Lambe's Contributions to Canadian Palaeontology, Part II, on Vertebrata of the Mid-Cretaceous of the North-West Territory, etc. Can. Rec. of Sc., Vol. IX, No. 1, pp. 86 to 88, Jan., 1903. (Issued July, 1903.)
- CAMSELL, CHARLES.—"The Region South-West of Fort Smith, Slave River, N.W.T." Sum. Rep. Geol. Surv. Dept., pp. 149-167. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- CARTER, W. E. H.—"Mines of Eastern Ontario." Rep. Bureau of Mines, pp. 108-140. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- CARTER, W. E. H.—"Peat fuel, its manufacture and use." Rep. Bureau of Mines, pp. 191-234. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- CHALMERS, ROBERT.—"Artesian borings, surface deposits and ancient beaches in Ontario" (with map). Sum. Rep. Geol. Surv. Dept. for 1902, pp. 268-279. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- CIRKEL, FRITZ.—"Vorkommen und Gewinnung von Asbest in Canada." Zeitschrift für praktische Geologie, XI, Jahrgang, April, 1903, pp. 123-131 (illustrations), figs. 33, 34 and 35.
- CLARKE, C. H.—"Notes on the Michipicoton gold belt." Eng. and Mg. Jour. Vol. 75, pp. 735-736, 1903.
- COLEMAN, A. P.—"Types of Iron Bearing Rocks in Ontario." Eng. and Mg. Jour. Vol. 75, pp. 294-295, 1903.
- COLEMAN, A. P.—"The Borazean Ice-field." The Geogr. Journ., Vol. XXI, No. 5 (May, 1903), pp. 502-510 (illustrated). London, Eng.
- COLEMAN, A. P.—"The Sudbury Nickel Deposits" (illustrated). Rep. Bureau of Mines, pp. 235-303. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.

- COLLIE, NORMAN, and H. E. M. STUTFIELD.—“Climbs and Explorations in the Canadian Rockies” (with maps and illustrations), pp. 12 and 344. Longmans, Green & Co., London, Eng.
- COLLIE, J. NORMAN.—“Further Explorations in the Canadian Rocky Mountains” (with map). The Geogr. Journal, Vol. XXI, No. 5, May, 1903, pp. 485-502 (illustrated). London, Eng.
- COSTE, EUGENE.—“Volcanic Origin of Natural Gas and Petroleum.” Journ. Can. Min. Inst., Vol. VI, pp. 73-128. Ottawa, March, 1903.
- COSTE, EUGENE.—“A Few Suggestions on Mineral Statistics.” Journ. Can. Min. Inst., Vol. VI, pp. 408-410. Ottawa, March, 1903.
- CRAIG, W. DIXON.—“The Modern Blast Furnace Laboratory and its work.” Journ. Can. Min. Inst., Vol. VI, pp. 288-300. Ottawa, March, 1903.
- DALY, REGINALD A.—“The Mechanics of Igneous Intrusion.” The Amer. Journ. Sc., Vol. XV, April, 1903, pp. 269-298. New Haven, Conn., U.S.A.
- DALY, R. A.—Variolitic Pillow-lava from Newfoundland. Am. Geologist, August, 1903, Vol. XXXII, pp. 65-78.
- DALY, R. A.—“Mechanics of Igneous Intrusion.” Amer. Journ. Sc., Vol. XV, April, 1903, pp. 269-299. New Haven. (Separates.)
- DALY, R. A.—Geology of the Western Part of the International Boundary” (49th parallel). Sum. Rep. Geol. Surv. Dept., pp. 136-147. Printed by order of Parliament by S. E. Dawson, King’s Printer, Ottawa, 1903.
- DENIS, THEO.—“Bulletin on Platinum.” Bull. No. 1 Sec. of Mines, Mineral Resources of Canada, Geol. Surv. Can., 26 pp., 5-26. Ottawa, 1903.
- DIXON, J. D. and A. W. NOLAN.—“Geology of St. Helen’s Island.” Can. Rec. Sc., Vol. IX, No. 1 (Jan., 1903), pp. 53-66 (issued, July, 1903). Sketch maps and sections.
- DICKSON, C. W.—“The ore deposits of Sudbury, Ont.” Columbia Univ. Contr. from Geol. Dept. Vol. 11, No. 91, 65 pp., figs. 1-26, 1903; Am. Inst. Mg. Engrs. Trans. (Albany Meeting, Feb. 1903), 65 pp.
- DICKSON, C. W.—“Note on the condition of platinum in the nickel-copper ores from Sudbury, Ontario.” Am. Jour. Sci. 4th ser., Vol. 15, pp. 137-139, 1903.
- DOWLING, D. B.—Notes to Accompany Contoured Plan of the Lower Slope of Turtle Mountain, Manitoba. Sum. Rep. Geol. Surv. Dept. for 1902, pp. 191-201. Printed by order of Parliament by S. E. Dawson, King’s Printer, Ottawa, 1903.
- DOWLING, D. B.—Report on Geological Explorations in Athabasca, Saskatchewan and Keewatin Districts, including Moose Lake and the route from Cumberland Lake to the Churchill River, and the upper parts of Burntwood and Grass Rivers, Report FF. Ann. Rep. Geol. Surv. Can., Vol. XIII, (No. 787,) pp. 1-44. Illustrated (map). Feb. 14th, 1903.
- DOWLING, D. B.—Eastern Assiniboia and Southern Manitoba (with map). Sum. Rep. Geol. Surv. Dept. for 1902, pp. 180-190. Printed by order of Parliament by S. E. Dawson, King’s Printer, Ottawa, 1903.
- DRESSER, JOHN A.—“On the physical geography of a northern section of the Appalachian mountain system.” Am. Bur. Geog., Bull., Vol. 1, pp. 275-279, 1900.
- DRESSER, J. A.—“An investigation of the copper-bearing rocks of the Eastern Townships, Province of Quebec. Sum. Rep. Geol. Surv. Dept. for 1902, pp. 302-317. Printed by order of Parliament by S. E. Dawson, King’s Printer, Ottawa, 1903.

- ELLS, R. W. — "Report on the Geology of Prince Edward Island with reference to proposed borings for coal" (with map). Sum. Rep. Geol. Surv. Dept. for 1902, pp. 367-377. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- ELLS, R. W. — "The Progress of Geological Investigations in Nova Scotia." Proc. and Trans. Nova Scotian Inst. Sc., Vol. X, pp. 433-446 (1901-1902). Halifax.
- ELLS, R. W. — "The Albert shale district of Albert and Westmoreland Counties, N.B." Sum. Rep. Geol. Surv. Dept. for 1902, pp. 361-367. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- ELLS, R. W. — "The Oil Fields of Gaspé" (with map). Sum. Rep. Geol. Surv. Dept. for 1902, pp. 338-361. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- ELLS, R. W. — "Bulletin on Asbestos." Mineral Resources of Canada; Geol. Surv. Can. Ottawa, 1903, 27 pp., No. 854 Geol. Surv. Publ.
- ELLS, R. W. — "General Report on the work of 1902." Sum. Rep. Geol. Surv. Dept. for 1902, pp. 337-338. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- ELLS, R. W. — "The Progress of Geological Investigation in Nova Scotia." Bull. and Trans. Nova Scotian Inst. Sci., pp. 433-446; Halifax, N.S. Date of publication; March 2, 1903.
- ELLS, R. W. — "Notes on some interesting Rock-contacts in the Kingston District, Ontario." Trans. Roy. Soc. Can.; 2nd ser., 1903-4, Vol. IX, Sect. 4, J. Hope and Son, Ottawa, 1903.
- EVANS, H. F. — "Canadian Geology." Mg. & Sci. Press, Vol. 86, pp. 299-300, 1903.
- EVANS, M. F. — "The Adams Lake series, British Columbia." Mg. & Sci. Press, Vol. 86, pp. 348-349, 1903.
- EVANS, NEVIL NORTON. — "Native Arsenic from Montreal," Art. VII. Am. Journ. Sc., Vol. XV, Feb., 1903, pp. 92-93. New Haven, Conn. (Separates.)
- FARIBAULT, E. R. — "Deep Gold Mining in Nova Scotia," pp. 3-16. Printed by order of the Government of Nova Scotia, 1903. (Halifax.) Preface pp. 1-2, by E. Gilpin. (Deputy Commissioner Public Works and Mines.)
- FARIBAULT, E. RODOLPHE. — "Nova Scotia Gold-fields" (with vertical sections). Sum. Rep. Geol. Surv. Dept., for 1902, pp. 399-427. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- FARIBAULT, E. R. — Review of "Deep Gold Mining in Nova Scotia"; a report on the best method of testing the value of the deeper gold deposits of Nova Scotia. Printed by order of the Government of Nova Scotia. Can. Min. Rev., Vol XXII, No. 11, pp. 229-230, November, 1903. Ottawa, Ontario.
- FLETCHER, HUGH. — "Surveys and Explorations in Richmond, Cape Breton, Kings, Cumberland and other Counties in Nova Scotia." Sum. Rep. Geol. Surv. Dept. for 1902, pp. 388-399. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- FOORD, A. H. — Review of (Ann. Rep. Geol. Surv. Can., Vol. XII, Reports A., B., C., G., I., J., M., O., R. and S. Plates and maps. Ottawa, S. E. Dawson, 1902). In Geol. Mag. (N.S.), Dec. 4, Vol. X, No. 11, Nov., 1903, pp. 519-524. London, Eng.

- GANONG, W. F.—"Notes on the Natural History and Physiography of New Brunswick (with maps). Bull. Nat. Hist. Soc. N. Br., pp. 35-52, Vol. V. St. John, N.B., 1903.
- GEOLOGICAL SURVEY OF CANADA.—"Geological Survey." (Reprint of Hansard or debates of the House of Commons). Can. Min. Review, Vol XXII, No. 7, July, 1903, pp. 156-159.
- GEOLOGICAL SURVEY.—"A danger ahead." Can. Min. Rev., Vol. XXII, No. 10, pp. 202 and 203, Oct., 1903. Ottawa, Ontario.
- GEOL. SURV. CAN.—"Summary Report of Geological Survey Department of Can. for the Calendar year 1902." Printed by order of Parliament Geol. Surv. publication No. 816, Sessional paper No 26, 2-3 Edward VII, A. 1903, 408 pp. (Illustrated, maps.) Ottawa, Can.
- GEOLOGICAL SURVEY DEPARTMENT.—Summary Report of the operations of the Geological Survey Department of Can. for the Calendar year 1902. Addressed to Hon. Cliff. Sifton, M.P., Minister of Interior, with maps and illustrations, 480 pp. Ottawa, Can., 1903. Printed by S. E. Dawson, King's Printer.
- GEOLOGICAL SURVEY OF CANADA, by A. H. Foord.—Review of ("Ann. Rep. (New Series), Vol. XII, reports A., B., C., G., I., J., M., O., R. and S. Plates and maps. Ottawa, S. E. Dawson, 1902.") Geol. Mag., N.S., Dec. 4, Vol. X, No. 11, November, 1903, pp. 519-522. London, England.
- GIBSON, THOS. W.—"Twelfth Report of the Bureau of Mines "Statistics for 1902." Rep. Bureau of Mines, pp. 7-53. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- GILPIN, EDWIN.—Report on the Mines of Nova Scotia. (Legislative Assembly Blue Books), 116 pp. Halifax, 1903 (Nova Scotia).
- GOLDSCHMIDT, V.—and NICOL, W., "New form of sperylite." Am. Jour. Sci. 4th Ser., Vol. 15, pp. 450-458, figs. 1-5, 1903.
- GOODWIN, W. L.—"Summer Mining School." Report of the Bureau of Mines, pp. 54-61. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- GRANT, C. C.—"Geological Notes." Hamilton Sci. Assoc. Jour. and Proc. No. 19, pp. 111-127, 5 figs., 1903.
- GRANT, C. C.—"The Origin of Petroleum." Hamilton Sci. Assoc. Jour. and Proc., No. 19, pp. 142-145, 1903.
- GRATON, L. C.—"Up and down the Mississaga " (illustrated). Rep. Bureau of Mines, pp. 157-172. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- GRATON, LOUIS CARYL (B.S.).—"On the petrographical relations of the Laurentian limestones and the granite in the Township of Glamorgan, Haliburton County, Ontario " (with sketch map). Can. Rec. Sc., Vol. IX, No. 1, Jan., 1903 (issued July, 1903), pp. 1-38.
- GREEN, RAOUL.—"The Frank Disaster." Can. Mg. Review, Vol. 22, pp. 103, 110, 111, 1903.
- HAANEL, EUGENE.—Report of the Superintendent of Mines, 1902. Department of the Interior, Part VI. Ann. Rep., 1902, 16 pp. Ottawa, Government Printing Bureau, 1903.
- HAANEL, EUGENE.—Report on copper belt and coal lands near White Horse, Y.T., and on the mining conditions of the Klondike, Y.T. "Appendix to the

- Report of the Superintendent of Mines." Dept. of the Interior (Canada), Part VI. Ann. Rep., 1902. Govt. Printing Bureau, 1903 (26 pp.), Section, map, illustrations.
- HARRINGTON, B. J.—"Composition of some Canadian Amphiboles." Amer. Journ. Sc., Vol. XV, May, 1903, pp. 392-395, 1903. New Haven, Conn.
- HARRINGTON, B. J.—"On the formula of Bornite." Am. Jour. Sci., 4th ser., Vol. 16, pp. 151-154, 1903.
- HANBURY, DAVID T.—"Through the Barren Ground of North-Eastern Canada to the Arctic Coast" (with map). The Geogr. Journ., Vol. XXII, No. 2, Aug., 1903, pp. 178-191, August, 1903. London, Eng.
- HATCHER, J. B.—"The Stratigraphic Position of the Judith-River beds and their correlation with the Belly-River Beds." Science, new series, Vol. 18, pp. 211-212, 1903. New York City.
- HAYCOCK, ERNEST.—"Geology of the West Coast of Vancouver Island." Sum. Rep. Geol. Surv. Dept., pp. 74-90. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- HILLE, F.—Genesis of the Animikie Iron Range." Journ. Can. Min. Inst., Vol. VI, pp. 245-287. Ottawa, March, 1903.
- HIND, H. Y.—"Report on the Petroleum Indications, at Cheverie, Hants Co., N.S.," in reference to the probability of a permanent supply being reached by boring, 1903, 16 pp. R. D. Robinson, Publishers.
- HITCHCOCK, C. H.—"The Story of Niagara." Americ. Antiquarian, Vol. 23, . 1-24, ill., 1901.
- HOBART, FRANK.—"Some Possibilities of Mining in Canada." Journ. Can. Min. Inst., Vol. VI, pp. 313-316. Ottawa, March, 1903.
- HOFFMANN, G. C.—"Chemistry and Mineralogy." Sum. Rep. Geol. Surv. Dept. for 1902, pp. 427-439. Printed by order of Parliament by S. E. Dawson, Ottawa, 1903.
- HUNTER, A. F.—"The Algonquin shore-line in Simcoe County, Ontario." Sum. Rep. Geol. Surv. Rep. for 1902, pp. 279-302. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- INGALL, E. D.—"Geology of the Bruce Mines District." Sum. Rep. Geol. Surv. Dept. for 1902, pp. 242-252. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- INGALL, E. D.—"Report of the Mines Section for 1902." Sum. Rep. Geol. Surv. Dept. for 1902, pp. 439-452. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- JOHNSON, GEORGE.—"Mineral Production, Canada and United States." Journ. Can. Min. Inst., Vol. VI, pp. 66-72. Ottawa, March, 1903.
- JEFFERSON, M. S. W.—"The Geography of Lake Huron at Kincardine, Ontario" (with map and illustrations). Journ. Geogr., Vol. II, 1903, pp. 141-155.
- JONES, T. RUPERT.—"The Laurentian Rocks of Canada." Geol. Mag. (N.S.), Dec. 4, Vol. X, No. 11, November, 1903, pp. 522-523. London, Eng.
- JONES T. RUPERT.—"On some Isochilinae from Canada and elsewhere in North America." Geol. Mag. (N.S.), Dec. 4, Vol. X, No. 7, July, 1903, pp. 300-304. London, Eng. Illustrated, figs. 1 to 3.
- JONES, T. RUPERT.—Review of "Contributions to Canadian Palaeontology." Vol. VII, Part II. On vertebrata of the Mid-Cretaceous of the North-West Territory, by H. F. Osborn and L. M. Lambe, 4to, 84 pp., with frontis-

- piece, 20 plates and 24 blocks of text-figures. Ottawa, 1902. Ann. and Mag. Nat. Hist., Ser. 7, Vol. XI, pp. 430-432. London, Eng.
- KELTIE, J. SCOTT.—"Polar Regions." "Ice in the Arctic Seas, 1902." (Summary of report by the Danish Meteorol. Inst.) The Geogr. Journ., Vol. XXII, No. 2, p. 218, Aug., 1903. London, Eng.
- KIRKEGAARD, P.—"Geology and Mining." The Engineering and Mining Journal, Vol. LXXVI, No. 6, Aug. 8, 1903, pp. 190-191. New York City.
- KIRKPATRICK, S. F.—"Notes on the Development of Metallurgy," Queen's Quarterly, Oct., 1903, pp. 169-175. Kingston, Ont.
- LAMBE, LAWRENCE M.—"Palæontological Work." Sum. Rep. Geol. Surv. Dept. for 1902, pp. 465-467. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- LAMBE, L. M.—"The Lower Jaw of *Dryptosaurus incrassatus* (Cope). Ottawa Nat., Vol. XVII, pp. 133-139, Nov., 1903 (3 plates). Separates issued Nov. 10, 1903 (same publication).
- LAMBE, L. M.—Recent Palæozoology: *Stegoceras* and *Stenocephalus*. Science, Vol. 18, No. 445, p. 60 ($\frac{1}{2}$ p.). ("Notice of Review of Nopsia's"), 1903.
- LEACH, W. W.—The Blairmore-Frank Coal-fields" (with map). Sum. Rep. Geol. Surv. Dept. for 1902, pp. 167-179. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- LECKIE, R. G.—Nickel Deposits in New Caledonia." Journ. Can. Min. Inst., Vol. VI, pp. 169-180 (illustrated). Ottawa, March, 1903.
- LINDGREN, W.—"The gold production of North America, its geological derivation and probable future." Intern. Mg. Cong. Proc., 5th sess., pp. 29-36, 1903.
- LINDGREN, W.—"The Geological Features of the gold production of North America." Am. Inst. Mg. Engrs., Trans., Vol. 33, pp. 799-845, 1903.
- MACDONALD, BERNARD.—"The ore deposits of Rossland, British Columbia." The Eng. and Mining Journ., N.Y.C., Vol. LXXVI, No. 6, pp. 198-199, 2 figs., 8th Aug., 1903.
- MACDONALD, BERNARD. Mining Possibilities in the Canadian Rockies." Journ. Can. Min. Inst., Vol. VI, pp. 337-354 (diagrams). Ottawa, March, 1903.
- MASON, F. H.—"Potter's Clay at Middle Musquodoboit, Nova Scotia." ill., Jour. Mining Soc. Nova Scotia, Vol. VI, (1900-1901 and 1901 and 1902), pp. 88-93, Halifax, N.S.
- MASON, F. H.—"Notes on Non-Coking Nova Scotia Coals." Jour. Min. Soc. Nova Scotia, Vol. VI, (1900-1901 and 1901-1902) pp. 43-44 (with discussion on same, pp. 45-46), Halifax, Nova Scotia. Received Feb. 27th, 1903.
- MATTHEW, G. F.—Notes on Cambrian Faunas. Trans. Roy. Soc. Can., Vol. VIII, Second Series, Sect. IV, pp. 93-112, 1902 (issued 1903).
- MATTHEW, G. F.—New Genera of Batrachian Foot-prints of the Carboniferous System in Eastern Canada. Can. Rec. of Sci., Vol. IX, No. 2, July, 1903, pp. 99-111. Reprinted as separate.
- MATTHEW, DR. G. F.—An Attempt to Classify Palæozoic Batrachian Foot-prints. Trans. Roy. Soc. Canada, 1903-4, 2nd Ser., Vol. IX, Sect. IV, pp. 109-121.
- MATTHEW, G. F.—Review of "Notes on Cambrian Faunas, with description of a new species of *Metoptomia*." (Trans. Roy. Soc. Can., Ser. 2 Vol. VIII.

- p. 93.) Geol. Mag. (N.S.), Dec. 4, Vol. X, No. 6, pp. 278-279. London, Eng.
- MATTHEW, G. F.—Review of article "On Batrachian and other Foot-prints from the Coal-Measures of Joggins, N.S." (Bull. Nat. Hist. Soc., New Brunswick, Vol. V, No. 21, 1903). Geol. Mag., N.S., Dec. 4, Vol. X, No. 7, July, 1903, p. 327. London, England. ($\frac{1}{2}$ p.).
- MATTHEW, G. F.—Review of "Om Slarpsbäckens, Dalgång, af John Chr., Moberg. (Aftryck in grol. faren. i Stockholm fährhand l., Bd., 24, H. 5, 1902. Amer. Geol., Vol. XXXI, No. 1, p. 53, Jan., 1903.
- MATTHEW, G. F.—"Report on the Cambrian Rocks of Cape Breton." Can. Geol. Surv. Rept. Camb. Rocks Cape Breton, 246 pp., 18 pls., 1903.
- MATTHEW, G. F.—"How long ago was America peopled?" Am. Geol., Vol. 32, pp. 195-196, 1903.
- MILLAIS, J. G.—"On some new Lakes and a little-known part of Central Newfoundland." The Geogr. Journ., Vol. XXII, No. 3, September, pp. 306-312 (Nfld.). London, Eng.
- MCINNES, WILLIAM.—"Region on the North-West side of Lake Nipigon." Sum. Rep. Geol. Surv. Dept. for 1902, pp. 206-211. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- MCINNES, WM.—Geol. Map of the "District of Rainy River." (Manitou Lake Sheet), No. 4. Nat. Scale, 1-253,440; scale 4 miles to 1 inch. No. 720.
- MCCONNELL, R. G.—"The Macmillan River, Yukon District" (with map). Sum. Rep. Geol. Surv. Dept., pp. 20-52. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1893.
- MEISSNER, C. A.—"On the Manufacture of Sulphuric Acid at Sydney." Journ. Can. Min. Inst., Vol. VI, pp. 390-407. Illustrations. Ottawa, March, 1903.
- MIERS, HENRY A.—"Gold Mining in Klondike." Royal Institution of Great Britain. (Proceedings of) weekly evening meeting, Friday, February 28th, 1902, George Matthew, Esq., F.R.S., Vice-President, in the chair (separates), 10 pp., 1902.
- MIERS, H. A.—Yukon: A visit to the Yukon Gold-fields. Letter from Henry A. Miers, D. Sc., F.R.S., Waynflete Professor of Mineralogy in the University of Oxford. August, 1901. Place of publication not given, probably Ottawa, Canada.
- MILLER, WILLET G.—"Mines of Northwestern Ontario" (illustrated). Rep. Bureau of Mines, pp. 73-107. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- MILLER, WILLET G.—"Iron Ranges of Northern Ontario (with maps and plans)." Rep. Bureau of Mines, pp. 304-317. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- MILLER, WILLET G.—"Notes on the History of the Mineral Industry in the Nineteenth Century." Journ. Can. Min. Inst., Vol. VI, pp. 21-46. Ottawa, March, 1903.
- MILLER, W. G.—"Nepheline Syenite in Western Ontario." Am. Geo., Vol. 32, pp. 182-185, 1903.
- MILLER, W. G.—"Cobalt-nickel arsenides and silver in Ontario." Eng. and Mg. Jour., Vol. 76, pp. 888-890, 1903.

- MILLER, W. G.—“In discussion of paper by Waldemar Lindgren, “The Geological features of the gold production of North America.” *Am. Inst., Mg. Engrs., Trans.*, Vol. 33, pp. 1077-1079, 1903.
- NOLAN (A. W.) and J. D. DIXON.—“Geology of St. Helen’s Island.” *Can. Rec. Science*, Vol. IX, No. 1, Jan., 1903, pp. 53-63 (issued July, 1903). (Sketch maps and sections.)
- OBALSKI, J.—“Mining in the Province of Quebec.” *Rep. of Bureau of Colonization and Mines. Quebec.* Printed by order of the Legislative Assembly, Quebec City, Quebec.
- OUTRAM, J.—“Climbs among the highest Canadian Rockies: Mounts Columbia, Lyell, Bryce and others.” *Appalachia*, Vol. X, pp. 142-163, 1903.
- PARKS, W. A.—“Fossiliferous Rocks of South-west Ontario.” *Rep. Bureau of Mines*, pp. 141-156. Printed by orders of the Legislative Assembly of Ontario. Toronto, 1903
- PARKS, WILLIAM ARTHUR.—“Region lying North-east of Lake Nipigon.” *Sum. Rep. Geol. Surv. Dept. for 1902*, pp. 211-220. Printed by order of Parliament by S. E. Dawson, King’s Printer, Ottawa, 1903.
- PEARY, R. E.—“Four Years’ Arctic Exploration, 1898-1902.” *The Geogr. Journ.*, Vol. XXII, No. 6, pp. 646-676 (illustr.). London, Eng., Dec., 1903.
- PENHALLOW, D. P.—Notes on Tertiary Plants. *Trans. Roy. Soc. Canada*, 1903-4, 2nd Series, Vol. IX, Sect. IV. Geological and Biological Sciences, pp. 33-95.
- PENHALLOW, D. P.—Some relics of an Ancient Flora. *The McGill University Magazine*, Vi. II, No. 2, April, 1903, pp. 99-122. Montreal, 1903.
- PIERS, II.—“Economic Minerals of Nova Scotia.” Provincial Exhibition, 1903. Dept. of Public Works and Mines, Halifax, N.S., 1903, 39 pp.
- PIERS, HARRY.—Report on Provincial Museum of Nova Scotia and Science Library for 1902. From Report of Dept. of Mines, Halifax, N.S. Comm. of Public Works and Mines. King’s Printer, pp. 3-9, 1903.
- PIERS, HARRY.—“The Provincial Museum and Science Library. Their History, and Aims.” *Jour. Min. Soc., Nova Scotia*, Vol. VI, (1900-1901 and 1901-1902), pp. 94-100, Halifax, N.S. Received Feb. 27, 1903.
- POOLE, H. S.—“The Carboniferous rocks of Chignecto Bay.” *Sum. Rep. Geol. Surv. Dept. for 1902*, pp. 377-382. Printed by order of Parliament by S. E. Dawson, King’s Printer, Ottawa, 1903.
- POOLE, H. S.—Notes on the Geology of Anthracite, Alberta.” *Sum. Rep. Geol. Surv. Dept.*, pp. 147-149. Printed by order of Parliament by S. E. Dawson, King’s Printer, Ottawa, 1903.
- POOLE, H. S.—“Notes on Dr. Ami’s paper on Dictyonema Slates of Angus Brook, New Canaan and Kentville, N.S.” *Proc. and Trans. Nova Scotia Inst. Sci.*, Vol. 10, (Vols. of 2nd series), part 4, pp. 451-454; Halifax, N.S.
- POOLE, H. S.—“A Submerged tributary to the great pre-Glacial river of the Gulf of St. Lawrence.” *Can. Roy. Soc., Proc. and Trans.*, 2nd ser., vol. 9, sect. 4, pp. 143-147, 1 fig., 1903.
- PRATT, JOSEPH HYDE.—“Canadian Chromite.” *Can. Min. Review*, Vol. XXII, No. 11, November, 1903, p. 222, Ottawa, Ontario. (Extracted from “Mineral Resources of the United States,” Washington.)
- PRATT, JOSEPH HYDE.—“Asbestos.” *Can. Min. Rev.*, Vol. XXII, No. 11, pp. 225-229. (“Canadian Asbestos” discussed on pp. 228-229). November, 1903. Ottawa, Ontario.

- PREST, WALTER H.—“Supplementary Notes on Drift Ice as a Transporting Agent.” *Proc. and Trans. Nova Scotian Inst. Sci.*, Vol. X, (Vol. 3 of 2nd ser.) No. 4, pp. 455-457.
- RIEHLE, C.—Note on Asbestos Mining in Asiatic Russia. *Jour. Can. Min. Inst.*, Vol. VI, p. 372. Illustration. Ottawa, March, 1903.
- SCHER, P.—“Preliminary Report on the Geological Observations made during the Second Norwegian Polar Expedition of the *Fram*” (with fuller details than contained in *Geogr. Journ. L.C.S.*), 10 pp. Printed on the occasion of the Sverdrup meeting of the Roy. Geogr. Society.
- SCHER, P.—“Summary of Geological Results” on “The Second Norwegian Polar Expedition in the *Fram*,” 1898-1902, by Otto Sverdrup (illustrated), *Geogr. Journ.*, Vol. XXII, No. 1, pp. 56-69. July, 1903.
- SELWYN, A. R. C.—(Obituary Notice of) Alfred R. C. Selwyn, C.M.G., LL.D., F.R.S., F.G.S. *Geol. Mag. (N.S.)*, Dec. 4, Vol. X, No. 2, Feb., 1903, p. 96. London, Eng.
- SENECAL, C. O.—“Mapping and Engraving.” *Sum. Rep. Geol. Surv. Dept. for 1902*, pp. 452-459. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- SMITH, FRANK B.—Mining in the North-West.” *Journ. Can. Min. Inst.*, Vol. VI., pp. 373-375. Ottawa, March, 1903.
- SMITH, FRANK B. (B.Sc., M.E.).—“The Frank Disaster.” *Can. Mining Review*, Vol. XXII., No. 5, pp. 102-109 (copiously illustrated), May, 1903.
- SMITH, H. I.—IV. “Shell-heaps of the Lower Fraser River, British Columbia,” with plates. Publications of the Jesup North Pacific Expedition. *Mem. Amer. Mus. Nat. Hist.*, Vol. IV, pp. 133-192. New York City.
- SPENCER, A. C.—“Pacific Mountain System in British Columbia and Alaska.” *Geol. Soc. Am., Bull.*, Vol. 14, pp. 117-132, pls. 8-13, 1903.
- SPENCER, J. W.—“Submarine Valleys off the American Coast and in the North Atlantic.” *Bull. Geol. Soc. Am.*, Vol. XIV, pp. 207-226. Rochester, July, 1903.
- STEAD, G.—Notes on Surface Geology of New Brunswick. *Bull. Nat. Hist. Soc., New Brunswick* (1903), Vol. V, 5-14, St. John, N.B.
- STONE, A. J.—“On the North-West Passage and the Circumnavigation of America.” *B. American G.S.* 35, 1903, 143-147.
- STUTFIELD (H. E. M.) and NORMAN COLLIE.—“Climbs and Explorations in the Canadian Rockies, pp. 12 and 344, maps and illustrations. Longmans, Green & Co., London, Eng.
- SVERDRUP, OTTO.—“The Second Norwegian Polar Expedition in the ‘*Fram*,’” 1898-1902. *The Geogr. Journ.*, Vol. XXII, No. 1, July, 1903, pp. 38-56 (illustrated). London, Eng.
- THATCHER, J. B.—A correction of Prof. Osborn's note entitled “New Vertebrates of the Mid-Cretaceous.” *Science*, Vol. 16, Nov. 21, 1902. (Omitted in last list.)
- TYRRELL, J. B.—Report on Explorations in the North-eastern portion of the District of Saskatchewan and adjacent parts of the District of Keewatin. Part F. *Ann. Rep. Geol. Surv. Can.*, Vol. XIII (1902), No. 786, 48 pp. (illustrated, and map). Government Printing Bureau, 1903.
- TYRRELL, J. B.—“A Peculiar Artesian Well in the Klondike.” *Eng. and Mg. Journ.*, Vol. 75, p. 188, 1 fig., 1903.

- TYRRELL, J. B. (and D. B. DOWLING).—Reports on the Northern Portion of the District of Saskatchewan and adjacent parts of the Districts of Athabasca and Keewatin (Grass River^a Map, No. 766), published under one cover. Parts F and FF. Ann. Rep. Geol. Surv. Can., Vol. XIII (Nos. 786 and 787), 48 pp. and 44 pp. respectively. Ottawa, Government Printing Bureau. (Illustrated, map.) 1902. Issued Feb. 14th, 1903.
- THOMPSON, WM.—Comparison of the Cost of Compressing Air with Steam and Electricity at Rossland, B.C. Journ. Can. Min. Inst. Vol. VI, pp. 180-188, Ottawa, March, 1903.
- WATSON, L. W.—Francis Bain, Geologist. Trans. Roy. Soc. Canada, 1903-4, 2nd Series, Vol. IX, Sect. IV, pp. 135-142. Geological and Biological Sciences.
- WEBSTER, ARTHUR.—"Geology of the West Coast of Vancouver Island." Sum. Rep. Geol. Surv. Dept., pp. 52-74. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa.
- WEEKS, F. B.—"Bibliography and Index of North American Geology, Palaeontology and Mineralogy for the year 1902." Bull. 221, U.S.G.S., pp. 200, 1903.
- WELLS, J. WALTER.—"Progress in Magnetic Concentration of Iron Ore." Journ. Can. Min. Inst., Vol. VI, pp. 6-20 (illustrated). Ottawa, March, 1904.
- WELLS, J. WALTER.—"Magnetic Concentration of Iron Ores" (illustrated). Rep. Bureau of Mines, pp. 322-342. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- WELLS, J. WALTER and A. G. BURROWS. "Provincial Assay Office." Rep. Bureau of Mines, pp. 68-72. Printed by order of the Legislative Assembly of Ontario. Toronto, 1903.
- WELLS, J. WALTER.—"Molybdenite: its Occurrence, Concentration and Uses" (illustrated). Can. Min. Rev., Vol. XXII, No. 6, June, 1903, pp. 113-118. Ottawa, Ontario.
- WELLS, J. WALTER. — Molybdenite : Its Occurrence, Concentration and Uses. Journ. Can. Min. Inst., Vol. VI, pp. 47-65 (illustrated.) Ottawa, March, 1903.
- WHEELER, A. O.—"Behind the Asulkan and Donkin Passes" (with map and plates). Appalachia, Vol. X, 1903, pp. 123-133.
- WHITE, JAMES.—"Economic Geography." Journ. Can. Min. Inst., Vol. VI, pp. 315-326. Ottawa, March, 1903.
- WHITE, JAMES.—"Economic Geography." Can. Min. Review, Vol. XXII, No. 4, pp. 89-93. Ottawa, Ont.
- WHITEAVES, J. F.—"Description of a fossil Cyrena from Alberta." Ott. Nat., Vol. XVI, p. 231, pl. 4, March, 1903.
- WHITEAVES, J. F.—"Crania of Extinct Bisons from the Klondike Creek Gravels." Ott. Nat., Vol. XVI, p. 240, March, 1903. Ottawa, Canada. (Bison crassicornis, Richardson.)
- WHITEAVES, J. F.—"Palaeontology and Zoology." Sum. Rep. Geol. Surv. Dept. for 1902, pp. 459-465. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- WHITEAVES, J. F.—"On some additional fossils from the Vancouver Cretaceous, with a revised list of the species therefrom." Mesozoic Fossils, Vol. I. Geological Surv. of Can., Part V, July, 1903, pp. 303-415. (Geol. Surv. Publ. No. 827.)

- WHITEAVES, J. F.—Description of a Species of *Cardioceras* from the Crows Nest Coal Fields. *Ottawa Naturalist*, Vol. XVII, No. 4, pp. 65-67, July, 1903 (illustr. figs. 1 and 1a).
- WHITEAVES, J. F.—Description of a new species of *Matheria*, from the Trenton Limestone of Ottawa. *Ottawa Naturalist*, May, 1903, Vol. XVII, No. 2, pp. 32-33. Ottawa, Canada.
- WHITEAVES, J. F.—“Notes on Some Canadian specimens of ‘*Lituities undatus*.’” *Ottawa Nat.*, Vol. 17, pp. 119-122, 1903.
- WHITEAVES, J. F.—“Additional Notes on Some Canadian Specimens of ‘*Lituities undatus*.’” *Ottawa Nat.*, Vol. 17, pp. 161-163, 1903.
- WILSON, A. W. G.—The Laurentian Penepplain. *Journal of Geology*, Vol. XI, No. 7, Oct.-Nov., 1903, pp. 615-669. Chicago, Ill.
- WILSON, A. W. G.—A Geological Reconnaissance at the Head Waters of the Albany River. *Sum. Rep. Geol. Surv. Dept. for 1902*, pp. 201-206. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- WILSON, A. W. G.—“Theory of the Formation of Sedimentary Deposits.” A deductive study in Geology and its Application. *Can. Rec. of Sci.*, Vol. IX, No. 2, pp. 112-132, Montreal, 1903 (illustrated).
- WILSON, W. J.—“Reconnaissance Survey of Four Rivers South-west of James Bay” (with map). *Sum. Rep. Geol. Surv. Dept. for 1902*, pp. 220-241. Printed by order of Parliament by S. E. Dawson, King's Printer, Ottawa, 1903.
- WOODWARD, HENRY.—Obituary: Alfred R. C. Selwyn, C.M.G., LL.D., F.R.S., F.C.S. *Geol. Mag. (N.S.)*, Dec. 4, No. 10; No. 2, Feb., 1903, p. 96. London, Eng.
- WOODWARD, HENRY.—“Note on some fragmentary remains of fossils from the Upper Part of Mount Noyes (Canadian Rockies).” *Geol. Mag. (N.S.)*, Dec. 4, Vol. X, No. 7, July, 1903, pp. 297-298. London, Eng. (Illustrated figs. 1 to 3.)
- WOOLLEY, HERMANN.—“Six Weeks in the Canadian Rocky Mountains” (with map and illustrations). *Alpine Journal*, Vol. XXI, pp. 363-377, 1903. London, Eng.

AMERICAN LIBRARY,
NEW YORK.

MBL WHOI Library - Serials



5 WHSE 02243

